NOVEMBER • 1959

FIREMEN

VOLUME 26, NUMBER 11, COPYRIGHT 1959 NATIONAL FIRE PROTECTION ASSOCIATION PRINTED IN U. S. A.

Bulk Plant Fire in Kansas City, Kansas—*see page 7*

ATIONAL FIRE
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64th
year

TANK BLAST KILLS SIX › › › › › Page 8

SURVEY OF STATE AND PROVINCIAL FIREMEN'S TRAINING › › › › › Page 20

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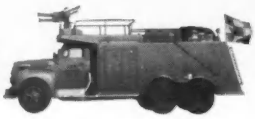

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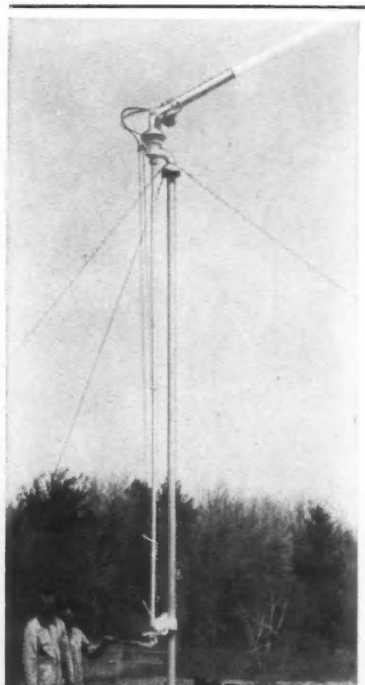

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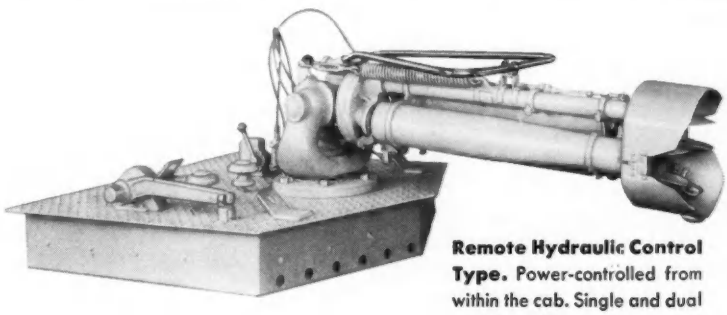

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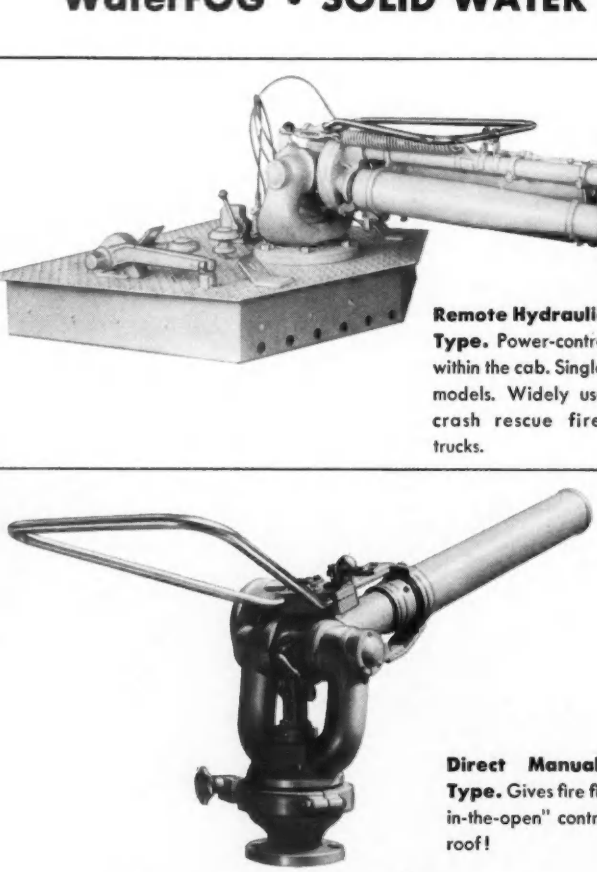

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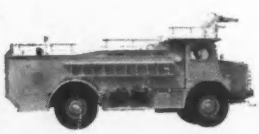

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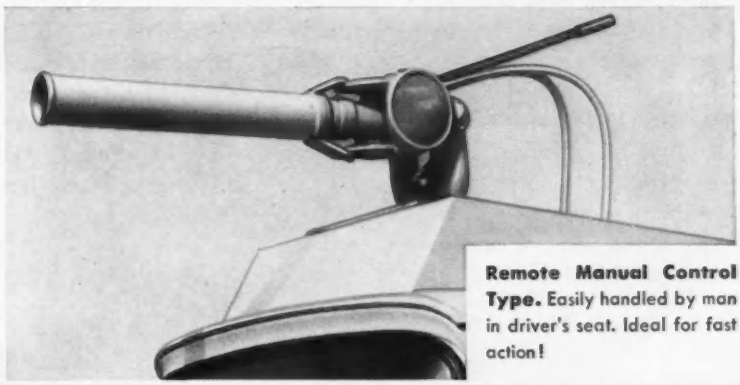

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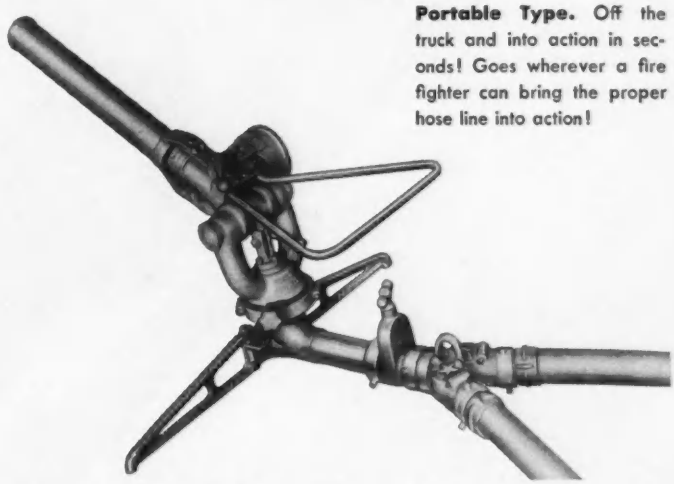

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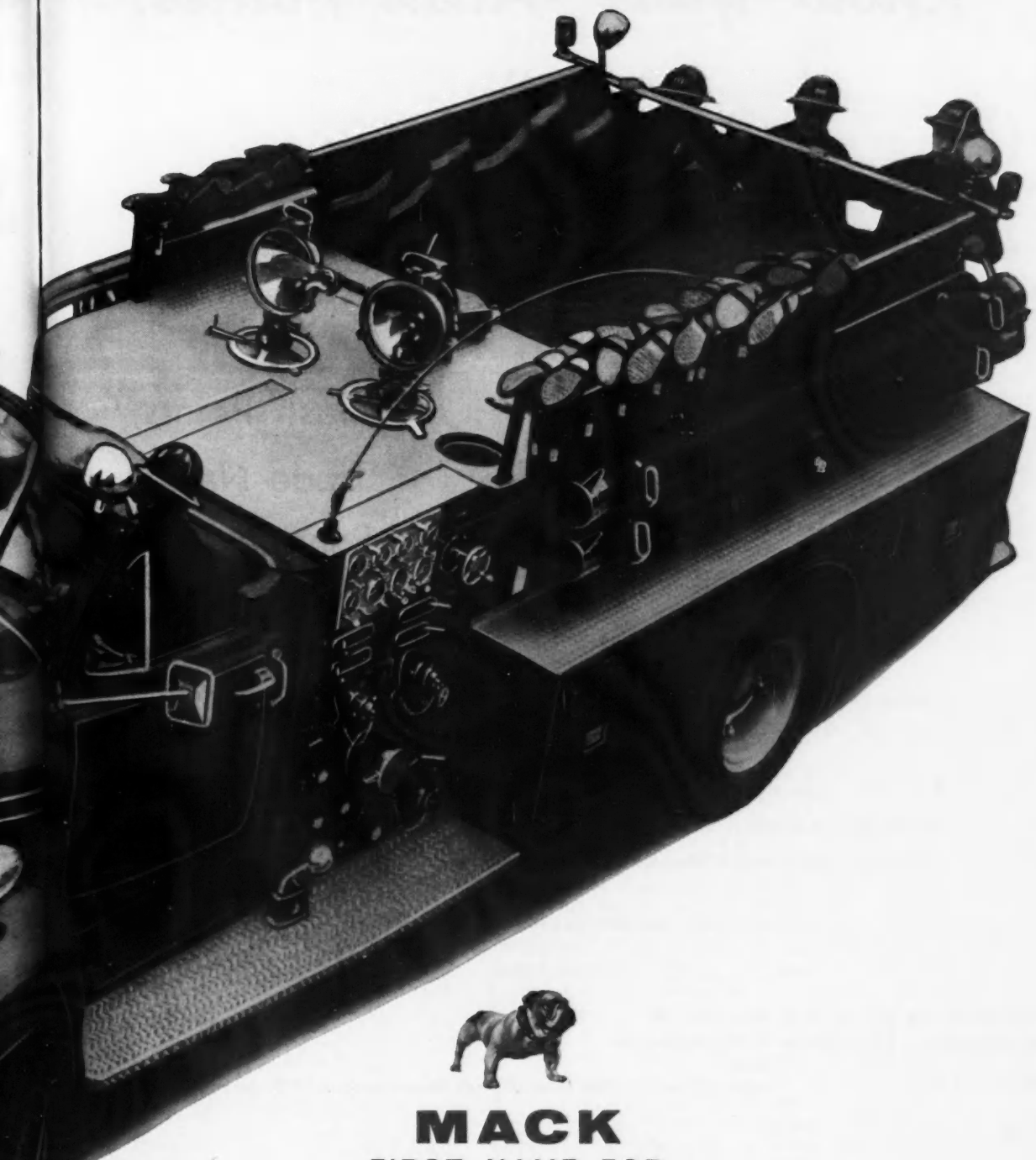

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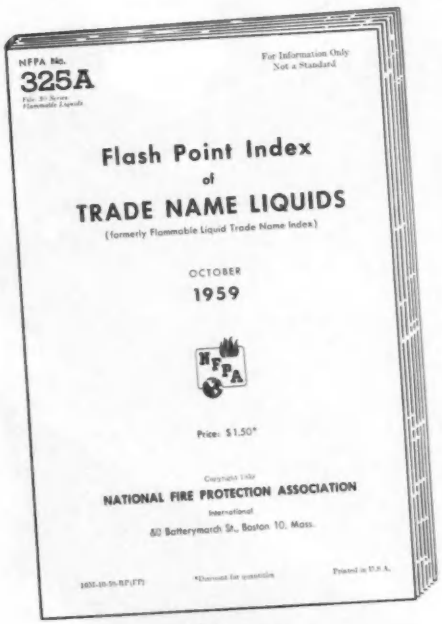

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FIREMEN

A monthly magazine published for the fire service members of the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

Volume 26 • Number 11

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A portion of the rolling mass of flame that engulfed fire fighters in Kansas City, Kansas, is shown on this month's cover. (*United Press International photo.*) Six men died and sixty-four were injured when a horizontal tank holding gasoline ruptured. The flaming fuel pushed directly into the street where the men were positioned for the fire attack. Some of the fire fighters were just beginning to withdraw when the tragedy happened. Immediately after the blast, efforts were concentrated on getting the burned and injured men to safety.

This Kansas City tragedy is of major significance to the fire service and should be given particular attention by those responsible for the training of fire fighters. The story of this fire and a summary of the major lessons will be found on page 8 of this issue. The report is being reprinted and will be available at 25 cents per copy with discounts granted for quantities.

●

In another month Christmas will be here and fire departments will be holding special fire safety programs for the holiday season. The NFPA is preparing its special Christmas poster and other materials to assist fire departments in these fire prevention activities. Again this year, two 16 mm. television films can be used, one of 20-second duration and the other of 60-second duration. These provide "spot" messages with musical background. The first is available for $3.25, the second costs $5.00. Both films may be obtained from the NFPA Publications Department.

●

Dr. William D. Claudy 1914–1959

On October 6, Dr. William D. Claudy, 45, died in his sleep at his home in Arlington, Virginia. Dr. Claudy, as a member of the Washington, D. C., Board of Fire and Police Surgeons, had gained a national reputation, not only for his dedicated service to fire department personnel during major fires and emergencies, but also as the author of a number of articles that have been highly important and useful to the fire service.

During the past 10 years he attended nearly every major fire in the District of Columbia and in nearby Virginia. He received a number of commendations for bravery at fires and other emergencies. In 1952, he was credited with saving the life of an Arlington, Virginia, fireman with artificial respiration. A year later, he saved the lives of several Washington, D. C., firemen, after fifty-five were injured in an explosion (see June, 1953, FIREMEN).

He was author of the book, *Respiratory Hazards of the Fire Service*, published by NFPA in 1957, and through the years he contributed such articles for FIREMEN magazine as "Handling Common Contagious Diseases in an Emergency Ambulance," "Methods of Artificial Respiration," "The Treatment of Burns," and "Carbon Monoxide in Fire Fighting."

A native of Washington, D. C., Dr. Claudy graduated from George Washington University Medical School in 1938, was appointed to the Board of Fire and Police Surgeons in 1944, and was a veteran of the United States Air Force.

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Here is the scene shown on this month's cover. Some of the men in the background were engulfed in the rolling mass of flame. (*United Press International photo.*)

TANK BLAST KILLS SIX, INJURES SIXTY-FOUR!

by Miles E. Woodworth
NFPA Flammable Liquids Engineer

Another tragedy in the history of fire fighting was recorded in this fire at Kansas City. Millions of people perhaps saw the television news film which captured that terrible moment when a horizontal tank failed and burning gasoline engulfed the fire fighters. Subsequent news reports told how other members of the fire departments at the scene threw themselves on top of the burned victims, or dragged them from the flaming area. The tragedy of this fire, and the lesson it presented, should be memorized by fire fighters and everyone else interested in the safety of fire fighters.

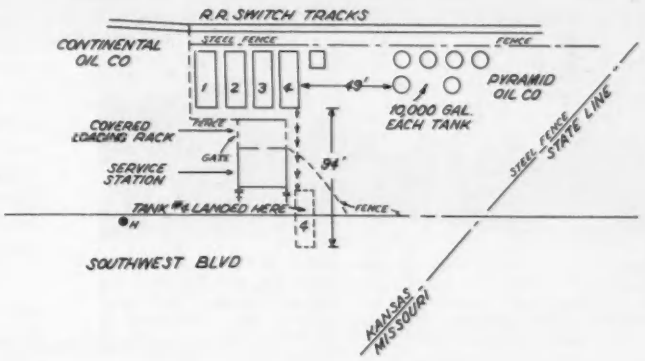
Aerial view of fire scene. Dotted box marks general area of bulk plant. Tank No. 4, at right of group, rocketed forward to street. Dark area of street at lower right was filled with burning gasoline when Kansas City, Missouri, Fire Department responded. With hose streams, the men pushed this burning mass of gasoline back to position in front of tanks, just before the tanks began to rupture. Arrow at lower right indicates position from which cover picture (top picture) was taken. Note burned area in railroad yards at top center, showing how flaming gasoline burst from other horizontal tanks which stayed on their supports. (*Photo by Anderson Photo Company.*)

ON AUGUST 18, 1959 at 8:20 A.M. a fire started at a loading rack of a combination bulk plant and service station in Kansas City, Kansas. Subsequently, five firemen and a civilian helping in the fire fighting were killed and 64 firemen were injured when a horizontal tank ruptured violently. The property loss from the fire was approximately $30,000.

The bulk plant and service station are located on property leased from the MKT Railroad and a portion of the property is sub-leased to the Pyramid Oil Company. The property abuts the state line separating Kansas City, Kansas and Kansas City, Missouri. (*See sketch, opposite page.*) The plant was installed in 1927 in accordance with standards of that date. However, as is true of many older plants, fire protection design features were not in compliance with modern standards which are based on the accumulated fire experiences of the past sixty years.

There were four 11 ft. by 30 ft. cylindrical horizontal tanks, each of 21,000 gallons capacity and each mounted on four nine-foot high concrete saddles. The tanks were the originals installed in 1927 but, for corrosion prevention, had been rotated on the saddles and an occasional new section had been installed. The tanks were separated from the loading rack by a 13-in. brick wall. A metal roof over the loading rack was supported by this wall and the rear wall of the service station. Both ends of the loading rack area were open.

The bulk plant area was separated from the service station by a fence which surrounded the bulk plants of both the Continental Oil Company and the Pyramid Oil Company. (*See photo at left.*) Service station windows into the loading area had been blocked up and the fence had been installed at the request of the Fire Prevention Division of the Kansas City, Kansas, Fire Department.



Sketch of bulk plant area showing location of tanks and position of Tank No. 4 after it ruptured. Eruption of burning gasoline followed generally the path of the tank's movement. All during fire fighting action, hose lines cooled the vertical tanks of Pyramid Oil Company at right. The location of this fire at the state line made response from both Kansas City fire departments practically "routine." Actually, the burning gasoline flowed down Southwest Boulevard into Missouri.

Three of the horizontal tanks contained gasoline and one held kerosene. Each tank was equipped with a two-inch combination pressure-vacuum flame arrester type vent. The Pyramid Oil Company tanks were vertical 10,000 gallon tanks and contained both gasoline and fuel oil. A small 275 gallon diesel oil tank was located adjacent to the horizontal tanks. Flow from the horizontal tanks to the loading racks was by gravity. Valves were located in the two-inch piping at the tanks and at the loading rack. In addition, a manual shut-off valve was installed in each fill line for the use of the man loading the tank vehicles.

Events Preceding the Fire

A compartmented tank vehicle was being loaded with two different grades of gasoline with simultaneous delivery being made into two compartments by the driver. Bonding wires between the loading rack and the tank vehicle were in place and the whole system was connected to ground by means of grounding wires. On the previous day Tank No. 1 contained 6,628 gallons of kerosene; Tank No. 2, 15,857 gallons of regular gasoline; Tank No. 3, approximately 3,000 gallons of regular gasoline; and Tank No. 4, 15,655 gallons of premium gasoline. Delivery was being made from Tanks No. 2 and No. 4.

An off-duty company employee had stopped by the plant and was climbing up to the loading platform, which was approximately four feet high constructed of concrete, to show a new unfilled cigarette lighter to the driver. The temperature at 7:50 A.M. was 81 degrees, a south wind was blowing at 12½ miles per hour and humidity was 71 per cent. At 9:50 A.M. the temperature was 85, wind south southwest at 8 miles per hour and the humidity was 66 per cent.

Fire Sequence

The cause of the fire was undetermined. It is known that the off-duty employee was carrying the cigarette lighter in his outstretched hand to show to the driver who was in the process of simultaneously filling two compartments of the tank vehicle. Both men noticed the flame originate at the dome covers but the flash of fire was so rapid that the men were burned and fell off the loading platform. They managed to escape from the area. Only one of the two valves shut off when the driver fell from the platform. As a result, gasoline continued to flow from Tank No. 4 through the open fill line. The resultant fire quickly involved the tanks, loading rack and filling station.

Fire Fighting

The Kansas City, Kansas, Fire Department alarm response was as follows: at 8:20 A.M. the alarm was received; three pumpers, two ladder trucks, and two district chiefs responded. At 8:35 two more pumpers were called; at 8:45 other equipment requested included a specially built deluge truck and foam; and at 9:20 two more pumpers and the off shift were called.

Chief Grass of the Kansas City, Missouri, Fire Department noticed the fire from his office window. After checking with his operator, and knowing that the Kansas City, Kansas, Fire Department was already there, he sent the closest district chief to investigate, because it appeared that the fire was close to the state border.

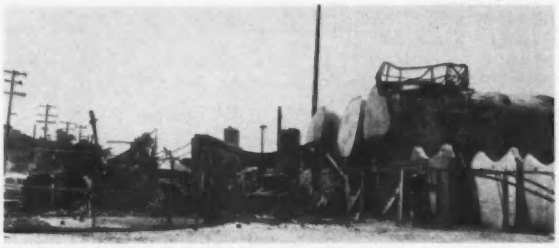
The district chief upon arrival immediately requested a first alarm assignment of companies. The deputy chief of the Kansas City, Missouri, Department was sent to the fire and he reported burning gasoline flowing down the street about one-half to two-thirds of a block into Missouri. He, therefore, called for additional help.

Although the exact times of the tank failures are unknown (*some time near 10:00 A.M. — Ed.*), it was thought that the overpressure failure of the tanks was progressive from Tanks No. 1 through No. 4. Tank No. 1, holding 6,628 gallons of kerosene, and Tank No. 2, containing 15,857 gallons of gasoline, both failed at their ends facing the railroad tracks. The heads of these tanks tore loose at the weld with some violence, but the tanks moved only about one foot on the concrete saddles. Tank No. 3, containing approximately 3,000 gallons of gasoline, tore loose at the weld only for a short distance near the top of the tank.

Tank No. 4 was the last to fail, approximately two hours after the fire originated. All tanks failed from overpressure, since the under-sized vents were unable to relieve adequately the vapors generated from the boiling liquid.

Table No. 3 of the Flammable Liquids Code, NFPA No. 30, requires a vent for this capacity tank to have a relief capacity of 166,000 cu. ft. of free air per hour. For a tank capable of withstanding five pounds per square inch internal pressure a four-inch free circular opening would be required.

Tank No. 4 rocketed a distance of 94 ft. and landed 15 ft. into the street. En route it went through the 13-in. brick wall separating the loading rack from the tanks and also knocked down one wall of the brick service station building. The end of Tank No. 4 facing the railroad track failed at the moment the tank



Front view of tank area showing empty saddle of Tank No. 4 and the remains of the covered loading rack where fire was first observed near dome cover of vehicle. The tank smashed through a 13-in. brick wall, then knocked down wall of filling station. *(Photos on this page by Anderson Photo Company.)*

started its skyrocketing action. The other end of the tank came off either en route or after landing. A large ball of fire from the remaining liquid in the tank covered the remaining 85 ft. of the 100 ft. wide street. It was this ball of fire which caught the firemen in its path.

Following the failure of Tank No. 4 at least one of the vertical tanks located at the Pyramid Oil Company was known to have been burning at the vents. Although all the tanks at the Pyramid Oil Company showed signs of fire exposure, they did not appear to be severely damaged.

Eleven fire companies from Kansas City, Missouri were at the fire before Tank No. 4 failed. Following this failure, six companies from the reserve were requested and one of the two off shifts was called back.

The district chief of the first alarm from the Kansas City, Kansas, Department attempted to have the tank valves shut off under the protection of water spray from "fog" nozzles. Due to the intense heat from the fire this was not possible. An attempt was also made to use foam to extinguish or control the fire which was, of course, unsuccessful due to the nature of the fire with its many obstructions and the limited amount of foam which could be applied from any available equipment.

Typical of flammable liquid fires is the problem of burning liquid flowing on the surface of the water used in the fire fighting. In this fire, hose lines covered the front and two sides of the plant and were used to protect exposures as well as being played directly onto the center of the fire. "Fog" nozzles were used to sweep the burning gasoline back to the center of the fire as a part of the procedure to protect exposures. Lines were also used to protect the tanks of the Pyramid Oil Company by keeping them cool. The high temperatures and high humidity made the fire fighting extremely exhausting work.

As reported by a chief officer of the Kansas City, Kansas, Department following the failure of Tank No. 4, those firemen who were uninjured picked themselves up and "fought as if they were mad" going in even closer to the fire than before to fight it.

Five firemen from the Kansas City, Missouri, Department and one civilian spectator, a friend of the men in one of the engine companies, were killed by the skyrocketing of Tank No. 4. Thirty-four firemen from Kansas City, Kansas and 30 firemen from the Kansas City, Missouri Department, and the chiefs of both departments were among those injured.

Conclusions

1. The ends of horizontal flammable liquid tanks are the weakest points. Normally, failure can be expected at the tank ends, either from overpressure or an internal explosion. When one end of a tank fails the resultant jet action will cause a skyrocketing effect. Accordingly, horizontal pressure vessels are sometimes referred to as "bullets" for this reason. So, fire fighters should always keep this basic rule in mind: *NEVER fight any horizontal tank fire from the end!*

2. Cooling water streams should be played directly onto the tanks, if possible. Water so applied will reduce the boiling of the liquid caused by the heat of the fire. Keeping the metal cool above the liquid level also maintains the strength of the steel.

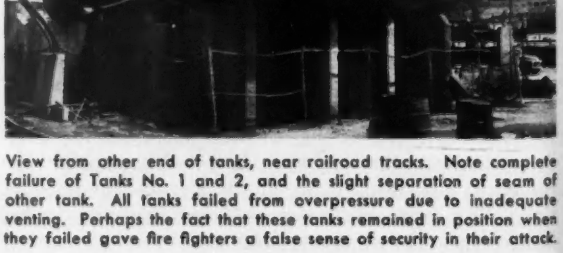
3. Tanks should be equipped with emergency vents to relieve the pressures built up under fire exposures. Every provision for emergency vents contained within Paragraph 2132 of NFPA No. 30, the Flammable Liquids Code, 1959 edition, should be adhered to rigidly. Existing tanks should be brought into compliance with these emergency venting requirements. Inadequate venting is a well proven, distinct hazard to life and property and as such the venting requirements can be made retroactive. *Warning.* Increasing the size of openings in tanks in flammable liquid service may in itself introduce a hazard. For further information see Cleaning of Small Tanks, NFPA No. 327.

4. Locating Class I and Class II flammable liquid loading racks adjacent to tanks and buildings places the potential point of fire origin near these exposures. For this reason the Flammable Liquids Code calls for a 25 foot separation.

5. In this Kansas City incident, the concrete saddles under the tanks remained in place undamaged and again proved their resistance to fire. The hazard of the common practice of using unprotected steel supports is well proven, and this fire unquestionably would have been much more severe if the concrete saddles had not been provided.

Acknowledgments

The writer wishes to express his appreciation to Chief Francis Doherty and Assistant Chief George A. Casey of the Kansas City, Kansas, Fire Department and to Chief Edgar M. Grass of the Kansas City, Missouri, Fire Department for their complete cooperation. Also appreciated is the cooperation of several other individuals who contributed information to the preparation of this report.



View from other end of tanks, near railroad tracks. Note complete failure of Tanks No. 1 and 2, and the slight separation of seam of other tank. All tanks failed from overpressure due to inadequate venting. Perhaps the fact that these tanks remained in position when they failed gave fire fighters a false sense of security in their attack.

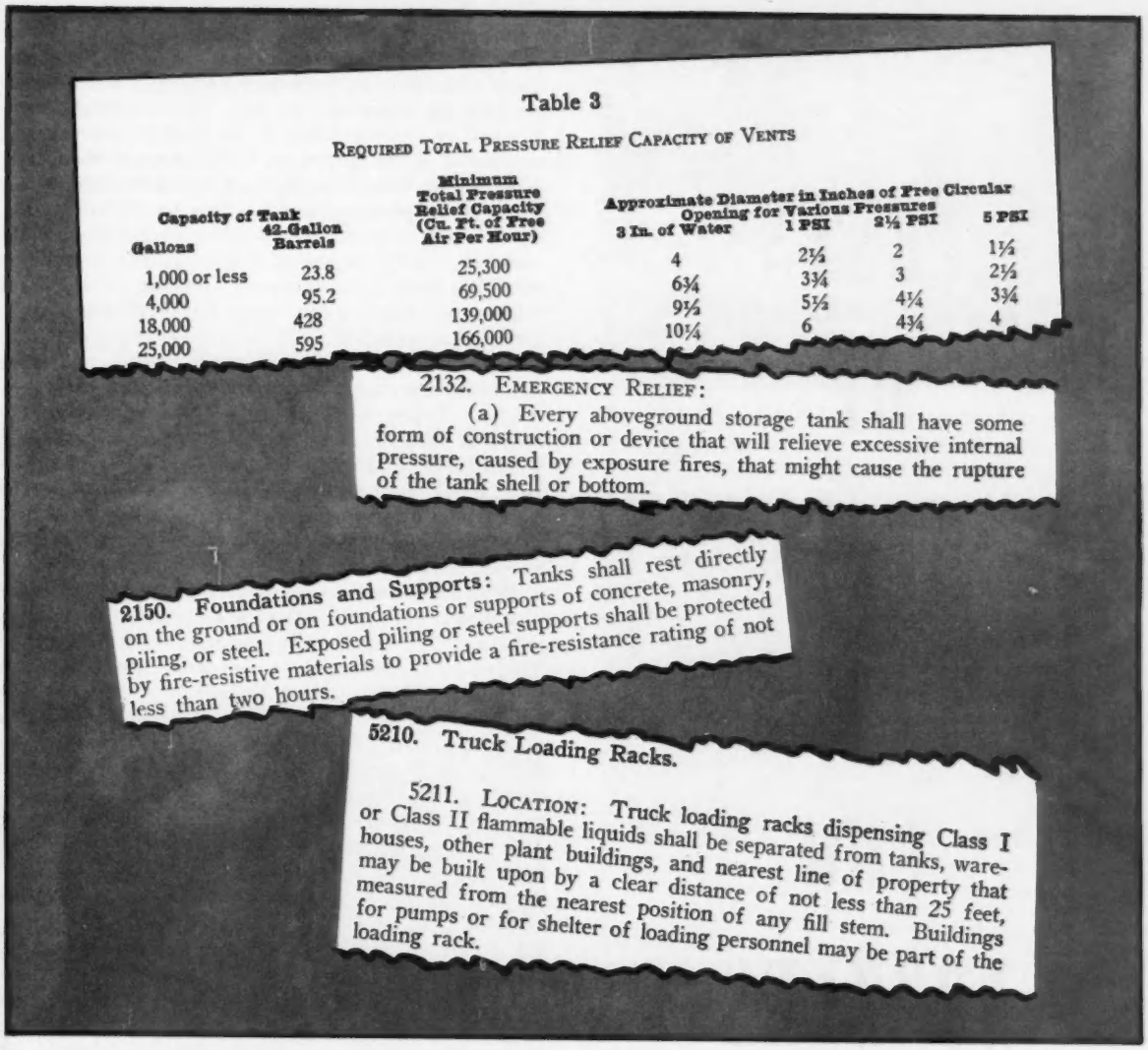


Table 3

REQUIRED TOTAL PRESSURE RELIEF CAPACITY OF VENTS

Capacity of Tank Gallons	Capacity of Tank 42-Gallon Barrels	Minimum Total Pressure Relief Capacity (Cu. Ft. of Free Air Per Hour)	Approximate Diameter in Inches of Free Circular Opening for Various Pressures 3 In. of Water	1 PSI	2½ PSI	5 PSI
1,000 or less	23.8	25,300	4	2½	2	1½
4,000	95.2	69,500	6¾	3¾	3	2½
18,000	428	139,000	9½	5½	4¼	3¾
25,000	595	166,000	10¼	6	4¾	4

2132. EMERGENCY RELIEF:

(a) Every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure, caused by exposure fires, that might cause the rupture of the tank shell or bottom.

2150. Foundations and Supports: Tanks shall rest directly on the ground or on foundations or supports of concrete, masonry, piling, or steel. Exposed piling or steel supports shall be protected by fire-resistive materials to provide a fire-resistance rating of not less than two hours.

5210. Truck Loading Racks.

5211. LOCATION: Truck loading racks dispensing Class I or Class II flammable liquids shall be separated from tanks, warehouses, other plant buildings, and nearest line of property that may be built upon by a clear distance of not less than 25 feet, measured from the nearest position of any fill stem. Buildings for pumps or for shelter of loading personnel may be part of the loading rack.

Some Comments on NFPA Standard No. 30 — "Flammable Liquids Code"

AFTER the Kansas City fire tragedy, both industry and the fire service are giving more attention to flammable liquid storage facilities. The NFPA Flammable Liquids Code presents basic recommendations which will minimize fire hazards and the fire control problem. The selected paragraphs shown above pertain directly to bulk plant installations.

For fire departments, the Flammable Liquids Code is particularly useful in pre-fire planning. When inspections uncover some situation that does not meet the minimum standards of the Code, then the fire department should immediately modify its fire control planning to be prepared for the worst possible situation.

For example, a tank with inadequate venting is apt to fail if exposed directly to fire. A tank resting on unprotected steel supports can be expected to collapse and perhaps rupture. If loading racks are too close to tanks or buildings, another hazard is presented.

Through the years the Code has been altered as fire experience brought the need for such revision. Here, for example, are some instances which brought such revision.

On October 28, 1954 in Philadelphia, Pa., ten firemen were killed when a pressure tank ruptured violently. A chemical reaction took place in the flammable liquid in the tank and because of a plugged, inadequate sized vent the buildup of pressure from the reaction caused the tank to fail.

On May 18, 1956 two firemen were killed in Galena, Md., when a horizontal tank skyrocketed during a fire when one end of the tank failed. This failure was caused by flame impinging on the tank shell from burning vapors from the vent causing the metal to soften. (Fire Loss Bulletin Series 1956–1.)

On July 19, 1956 nineteen firemen were killed fighting a fire involving a spheroid type tank when it suddenly ruptured releasing a huge ball of burning liquid. This failure also was caused by flame impinging on the tank shell from the burning vapors at the tank vent causing the metal to soften and the sudden rupture of the tank. (NFPA Quarterly reprint Q50–3.)

As a result of these fires Paragraph 2133 was included in the Flammable Liquids Code, NFPA No. 30, (*price 60 cents*) which reads as follows:

"2133. The outlet of all vents and vent drains on tanks designed for 0.5 pounds per square inch or greater pressure shall be arranged to discharge in such a way as to prevent localized overheating of any part of the tank, in the event vapors from such vents are ignited."

TESTS OF HEAVY STREAM FOG NOZZLES

A SUBCOMMITTEE of the NFPA Committee on Fire Department Equipment met at the Rochester, New York, Fire Academy in September to conduct tests of large-capacity fog nozzles. The subcommittee is headed by Deputy Chief Louis E. Vogt, in charge of apparatus of the Rochester Fire Bureau. Other members present were John Barman, Chief Engineer of the Missouri Inspection Bureau; Boyd Hartley, Engineer, National Board of Fire Underwriters; Warren Y. Kimball, NFPA; Raymond Kubec, Canadian Division of Akron Brass Manufacturing Company; and Hubert Walker, representing the Motor Fire Apparatus Manufacturers Association.

Tests were made of seventeen different fog nozzles submitted by Akron Brass Manufacturing Company, Elkhart Brass Manufacturing Company, Powhatan Brass & Iron Works, Rockwood Sprinkler Company, Santa Rosa Fire Nozzle, Inc., and Wooster Brass Division, Fyr-Fyter Company. Most of the manufacturers had representatives present witnessing the tests and there were a number of other observers from various fire service organizations.

With one exception, the nozzles tested were rated by the manufacturer at 500 gpm or larger. The largest nozzle had a manufacturer's rating of 2,500 gpm. Purpose of the testing was to determine the actual flows of these nozzles at various fog pattern settings, so that fire service personnel will know just how much water is being delivered at given pressures and be able to determine the pump and hose layout requirements.

Much credit for the success of the tests should go to the Rochester Fire Bureau headed by Commissioner K. C. Townson and Chief George Holzschuk. Other officers attending and assisting were Executive Deputy Chief John Hurley, Deputy Chief Clifford MacMillan of the Training Division, Captain Alfred Reifstack, Chief Training Instructor, Captain Ernest Starr, Training Officer, Captain Bernard D. Drexel, Lieutenant Donald W. Piffer, and Fire Fighter Eugene Tschiderer.

Readers of FIREMEN magazine may recall that some years ago the Committee on Fire Department Equipment conducted tests of various 1-in., 1½-in., and 2½-in. fog nozzles for hand lines and had also tested portable and fixed turret nozzles and ladder pipes. However, at the time of previous tests, instruments were

Seventeen large capacity fog nozzles submitted for tests at the Rochester Fire Academy by six nozzle manufacturers.

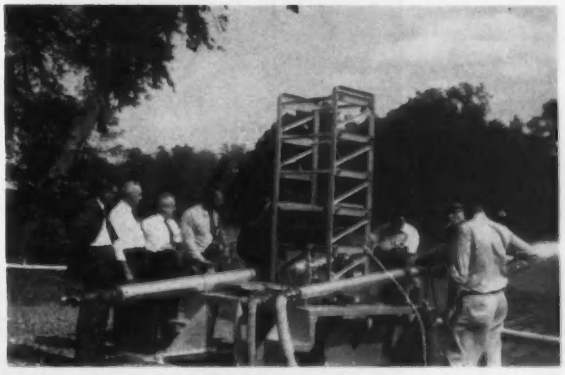
Engineer John Jablonsky of NBFU and Fire Fighter Tschiderer adjusting a stream to a 60 degree pattern.

not available for accurate determination of flows from the largest fog nozzles. This deficiency was corrected through the ingenuity of Chief Vogt who had the cooperation of the engineers of the Taylor Instrument Companies, located in Rochester.

The new test apparatus included 4-in. and 6-in. tubes having differential plates to determine flows and pressures. The flows were recorded on a meter supplied by Taylor Instrument Companies which used charts graduated or logged to a hydraulic scale. The 4-in. diameter flow tube was used to record flows up to 500 gpm, while the 6-in. flow tube recorded flows from 500 to 2,000 gpm. All nozzles were tested at 100 pounds pressure measured at the base of the nozzle, except that the 2,500 gpm nozzle had to be tested at somewhat lower pressures so that flow could be kept below 2,000 gpm.

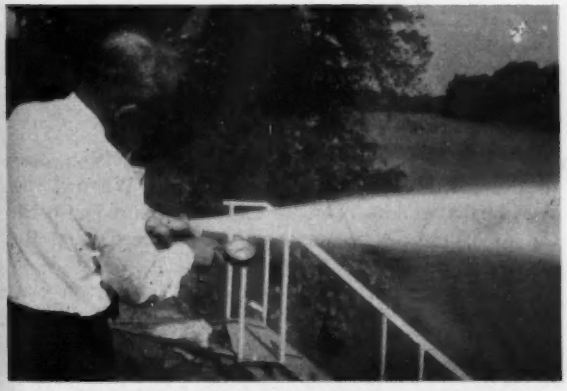
Instrumentation was handled by Raymond F. Owen, Engineer, Fluid Meter Section, Taylor Instrument Companies, who was assisted by James Chisholm of the same company. Members of the committee had various assignments such as measuring angles of streams, recording flows and pressures and photography. Among the observers who were particularly helpful to the committee were Engineer John Jablonsky of the National Board of Fire Underwriters, Chief James Rogers of Nassau County Office of Vocational Education and Captain Robert F. Daley, McKees Rocks, Pennsylvania.

Representatives of the Taylor Instrument Companies adjusting recorders prior to tests. An air compressor was used to maintain correct differential pressures on either side of the diaphragm in foreground.



Committee members and observers checking instrumentation. *Left to right:* Lloyd Layman, Fire Research Section, Federal Civil Defense Administration, Battle Creek; Chief George Holzschuk, Rochester Fire Bureau; Ray Kubec, Akron Brass; Deputy Chief MacMillan, Training Division, Rochester Fire Bureau; John Barman, Chief Engineer, Missouri Inspection Bureau; Fire Fighter Eugene Tschiderer; Deputy Chief Louis E. Vogt, and Captain Ernest Starr.

General view of test area at Rochester Fire Academy grounds along Genesee River. Two new 1,250 gpm Mack pumpers with single-stage Hale pumps, assembled in the Rochester Fire Bureau shops under the direction of Chief Vogt, were used to supply the flows needed. Lines from pumpers were siamesed into the tubes to which the nozzles were attached for testing. Permanent aluminum suction tubes were used in drafting water from the river.

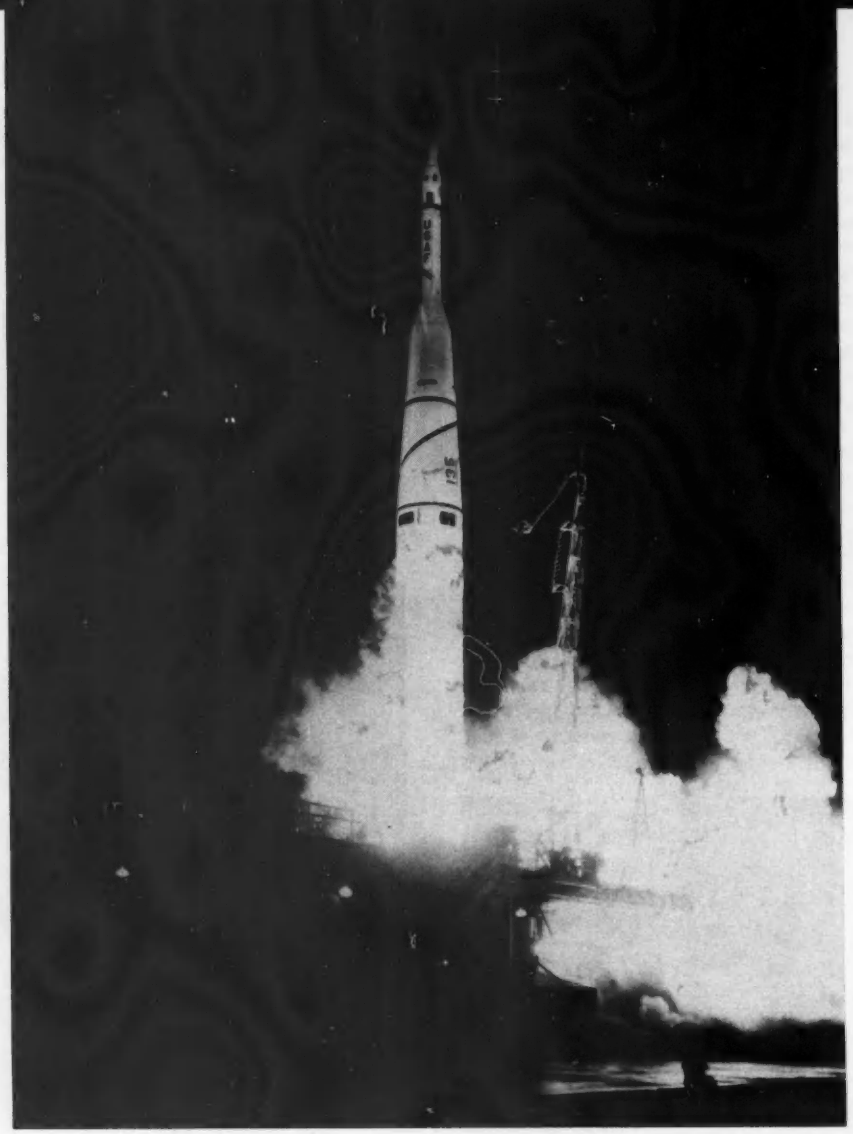


Committee member Raymond Kubec, Canadian Division of Akron Brass Mfg. Company, taking a Pitot reading from solid stream tip.

Mr. Owen explained that, considering all possible variables, the instrumentation was considered to be accurate within a plus or minus of 2 per cent. The subcommittee verified this by using the equipment to test flows from solid stream tips and most of the readings agreed almost exactly with published fire stream tables for solid streams.

The committee agreed on a uniform method for measuring angles of fog patterns with special protractors for 30, 60 and 90 degree settings on all adjustable nozzles. Nonadjustable nozzles were tested at a number of different pressures to observe any changes of patterns. In some cases, the pattern settings indicated by the manufacturers provided a different angle of fog from the standard measurements used by the committee, and in such cases readings were taken both at the manufacturers' settings and at the angles determined by the committee.

The results of the tests will be correlated and reported to the next meeting of the Committee on Fire Department Equipment and, if approved, will be published by NFPA for use by the fire service.



MISSILE FIREMEN

The story of the Cape Canaveral, Florida, Fire Department which protects the renowned missile launching site.

by L. B. Taylor, Jr.

A LITTLE over two years ago, on a quiet Thursday afternoon at Cape Canaveral, Florida, a piercing blast shattered the silence.

At T-minus zero on a routine countdown, a missile test vehicle rose three feet off its launching pad and exploded. Thousands of gallons of missile fuel were involved and damages were extensive enough to classify it as one of the worst mishaps in the Cape's history.

The astounding fact concerning this spectacular "launch" was that it took Cape Canaveral's Fire Department, staffed and operated by Pan American World Airways' Guided Missiles Range Division, only 10 minutes to get the fire under control. When it was over, 80,000 gallons of water had been poured into the pad area, and 13 firemen were hospitalized from the smoke and flames.

The need for heroic action that afternoon was typical of the "rise to the occasion" situations that have challenged Chief Norris C. Gray and his 143-man fire department in their five years on the Cape.

Chief Gray personally has seen the fire department at Canaveral grow from a crew of eight, back in 1949, to

the current strength. In fact, Gray and Deputy Chief Fred Van Lengen are two of the oldest missile veterans, in point of service, at the Cape Canaveral launching site of the Air Force Missile Test Center (ARDC). Both were among the handful of witnesses who watched the first missile launching ever attempted at the Cape, back in 1950 — the "Bumper" German V-2, with an Army Wac Corporal as its second stage.

In those days everyone had to run for cover during launches, and hastily dug foxholes weren't uncommon on the Cape. Today, of course, thick cement blockhouses reinforced with steel protect personnel, and crash trucks, pumpers and other apparatus guard each complex on the days of tests.

Pan American took over Cape fire fighting responsibilities under contract to the Air Force Missile Test Center in February, 1954. Today there are firemen on duty 24 hours a day, seven days a week to maintain fire prevention, inspection and protection for all activities and installations at the Cape and at nearby Port Canaveral, where missile-tracking ships come in for installations and repairs.

The responsibilities extend to the low tide mark along Canaveral's shores. However, when a Polaris missile — in the early stages of testing — strayed from its course and landed in the adjacent Banana River, south of the Cape, a Pan Am fire crew was on the scene in minutes, just in case it was needed.

To assure maximum protection, fire apparatus stands by on every missile test operation from before the fueling until after the launching — regardless of how long the countdown takes. Crash trucks also stand by during all aircraft and missile landings on the Cape's "skid strip," where some guided missiles are returned after their flights, and other new missiles are flown in from the west coast on huge cargo planes.

Fire fighting protection is also furnished for all operations involving missile fuels. These fuels are not only intricate and tricky, but also, in most cases, highly flammable and extremely dangerous. Firemen are, therefore, especially alert during all fuel-handling operations from storage areas to the missile.

A team of fire inspectors checks more than 350 structures and launch areas, most of which are extra hazardous occupancies. These inspectors also check monthly on 41 sprinkler and 49 fire alarm systems, and 5,000 portable fire extinguishers.

Pan American's new fire station at Cape Canaveral is one of the largest on any military reservation in the United States.

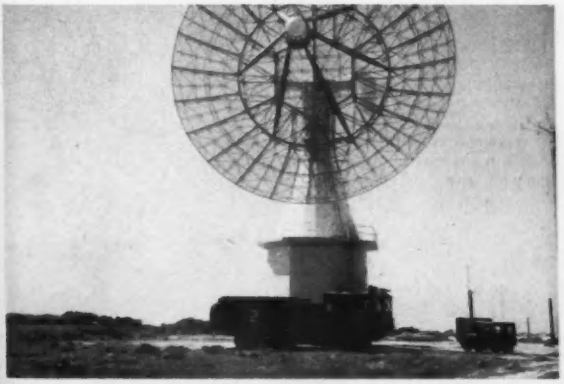
In addition to regular fire inspections, launching facilities are given a special checkout on the day prior to a test. The department also instructs range-user personnel in fire prevention and first-aid fire fighting principles upon request. It also provides special equipment to determine whether hazardous conditions exist for personnel using welding equipment or working on missile-fueling systems.

From the wide diversity of duties, it is obvious that fire fighting at Canaveral, like many other professions at the Cape, is a somewhat unique occupation. Firemen must know the work of an average fire department, plus the characteristics of and safeguards against all types of explosives, missiles and missile fuels.

To keep pace with the Cape's rapid growth, the fire fighters give top priority to training. Since each missile has its own particular characteristics, each must be carefully studied. When a new "bird" arrives at the Cape, everything from its destruct systems to the type of fuels it will use are analyzed carefully. Plans are then drawn up showing the most effective way a possible fire involving this missile could be fought.

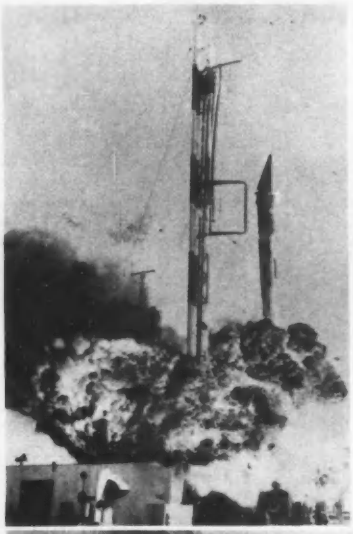
Firemen are trained on Cape building locations, and each man receives instruction on the operation of all fire fighting vehicles. Trainees and veterans alike also participate periodically in extinguishing pit fires for training purposes. Chief Gray estimates it takes three months to train a recruit properly.

To secure adequate fire protection at the Cape, Pan Am maintains numerous fire fighting vehicles. Of these, five are large, special purpose crash trucks that



Like the giant, watchful telemetry antenna, Pan American's fire trucks keep a silent vigil over all missile activities at Cape Canaveral.

Fire fighters must be familiar with the various missiles being tested and necessary fire fighting equipment. Here they participate in training.



(Left) When a missile backfires and blows up on its launching pad as the first Vanguard satellite did on December 6, 1957, fire fighters must move in quickly (below) to control the blaze before it causes extensive damage to the pad area and keep it from spreading to other launching areas.

carry 1,000 gallons of water and 100 gallons of foam. These crash trucks also carry 40 gallons of chlorobromomethane for fuel and electrical fires.

Three of these trucks have been modified to carry an armor plate screen on the front for added protection in danger areas. Once when a missile blew up high over the Cape, a metal chunk of the scattering debris came down through the roof of a fire truck's cab, then went on through the floorboard. Fortunately, no one was in the cab at the time.

In addition to the special purpose crash trucks, there are several 750 gpm pumpers with loads 1½- and 2½-in. hose lines; regular 500 gpm pumpers; rescue vehicles, complete with all rescue and first-aid equipment; 500 gpm "all around" pumpers that carry 400 gallons of water, 40 gallons of foam and other assorted equipment for missile, brush or structural fires; and low pressure carbon dioxide trucks, used for fighting crash, fuel and electrical fires.

For further protection against fires on the complexes, CO_2 high pressure bank systems, consisting of CO_2 bottles manifolded into an electromagnetic valve have been installed close by the missiles on the pads. These can be controlled by button from the blockhouses to fight any fires that might break out in the immediate minutes before a launch, when the area is cleared of personnel. Low pressure 750 pounds capacity CO_2, hooked in at the pad and controlled from the blockhouse, are also used.

The new Cape fire station, completed in October, 1957, is one of the largest on any military reservation in the country. Sleeping quarters are on the same floor as the fire trucks to save valuable time.

Pan Am also operates a second firehouse on the eastern tip of the Cape. This provides protection to all areas throughout Canaveral's nearly 15,000 acres of palmetto-stubbed terrain.

Under Chief Gray are Deputy Chief Van Lengen, Assistant Chiefs T. W. Brannen, L. E. Butler, J. P. Gornto, W. L. Hipp, and W. A. Laverick, Chief Inspector W. G. Hardy, six inspectors, 26 crew chiefs, 28 drivers, 70 firemen, six communications operators and one secretary.

The men work on a rotating schedule, and put in two 24-hour shifts and one 12-hour shift per week. On a typical day, a fresh crew arrives at 7:30 A.M. Roll call is taken and individual crews are assigned to the various missile complexes. At the station, maintenance and cleaning assignments keep the standby crews busy until noon. Training films and lectures are given during the afternoons according to the test.

With at least one truck on each complex during test operations or fuelings, the men in the fire station are ready as "run crews" when extra aid is needed. Emergency calls are channeled through the communications center in the station, where operators, like firemen, are on duty around the clock.

Actually, there have been few real emergency calls since Pan Am took over the fire protection job, but the ones that have arisen have been spectacular, and always well-publicized. Perhaps the most famous "blow-up" in Cape Canaveral's history was the ill-fated first Vanguard satellite try in December, 1957.

Five trucks responded to the celebrated Polaris brush fire last year, which took four hours to control. So widespread was this brush fire, that many snakes were driven out of the shrubs onto the highways, as a stiff wind spread the fire over thousands of acres of brush.

A Redstone tactical-range missile once boomeranged back onto its complex and set a network of electrical

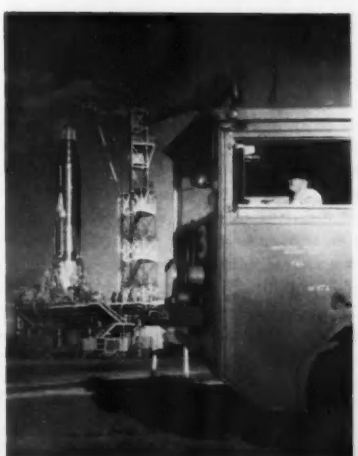
The launching of the Navy's Polaris Missile shows the blasting effect of turbulent flame and heat in the vicinity of the launching pad.

The Juno II space vehicle is shown just prior to explosion following its launching at Cape Canaveral on July 16, 1959. The four stage liquid and solid propellant rocket landed just 50 yards from the blockhouse where test personnel had to remain until fire fighters controlled the blaze.

equipment afire in a below ground tunnel. Firemen worked for two hours to control this blaze.

Most fires caused by missile shortcomings occur early in that particular "bird's" life at Canaveral. Chief Gray remembers the time an early Jupiter came down 500 feet in back of the Number Two fire station, blowing in all the windows and the back door.

With progressive testing techniques, these incidents are becoming more isolated. There has never been a death or serious accident at the Cape caused by missile explosions or resulting fires, and this can be interpreted as a genuine tribute to Pan American's well-trained fire crews — safety guardians of Cape Canaveral 24 hours a day.



Constant protection is provided by Cape fire fighters during all operations of every missile complex. (*Right*) One of the crash trucks stands by during the final countdown of an Air Force Atlas Intercontinental Ballistic Missile. (*Below*) The transfer of a highly flammable missile propellant requires equipment and men to be ready for a possible emergency.

Money for New Mexico Fire Departments!

STATE Fire Marshal R. F. Apodaca of New Mexico announced recently that his office has allocated $521,500 in 1959 fire protection funds to 78 municipal fire departments and 39 county fire departments. This amount is the largest ever distributed in the 34 years New Mexico fire departments have been receiving money from the fire protection fund.

The money is obtained by a tax of 2 per cent on all fire and motor vehicle insurance policies written in New Mexico. Local fire departments are allocated the money by the Fire Marshal's Office on the basis of their needs and may use the funds only for the purchase and maintenance of fire fighting equipment.

The amount each community receives is based upon the number of stations operated by the fire department. A maximum of $5,000 is given for the main station and $2,000 is allotted for each substation. Albuquerque received the largest 1959 allocation, $25,000. Santa Fe and Roswell received the next amount, $9,000 each. Clovis, Carlsbad and Gallup received $7,000 each. All other municipalities received $5,000. Each rural fire district received $2,500.

According to Marshal Apodaca, "The money from the fire protection fund is used to assist New Mexico communities in maintaining one of the most basic of all governmental services, that of providing adequate fire protection for residents."

New York City's Fire Prevention Campaign

ON SEPTEMBER 22, the New York City Fire Department began a concentrated campaign for educating the public in fire prevention. Nine selected battalion areas in which the incidence of fire has been high have been chosen as "target areas." In three months, from September 22 to December 21, New York City fire fighters will be working from one to four P.M. and seven to nine-thirty P.M. each day, seven days a week, to bring fire prevention messages into the apartments and homes of the designated areas.

For this special campaign, Deputy Assistant Chief Benjamin Aaronson of the Fire Prevention Education Unit, Division of Fire Prevention, prepared a useful bulletin for distribution to the department. The bulletin names the specific divisions and battalions that will take part in the campaign, outlines the indoctrination to be conducted by assistant and deputy assistant chiefs, presents the scope of the campaign, then gives detailed information on the selected fire companies and supporting companies that will perform a major part of the program.

In addition, the bulletin outlines the fundamentals of the door-to-door campaign, gives examples of the types of speeches that can be used by fire fighters, then lists the responsibilities of fire officers from the company level to assistant chiefs so that each has an understanding of his role in the campaign.

The press release accompanying the bulletin gives an over-all description of the campaign as reported by Fire Commissioner Edward F. Cavanagh, Jr. It mentions that the key areas of concentration are Harlem, the lower Bronx, Brownsville, East New York and Bedford-Stuyvesant where more than 30 per cent of the total number of fires in New York City occur.

Fire fighters from Engine 10 and Ladder 8 of the Cleveland Fire Department on improvised raft in waist-deep water on their way to rescue stranded occupants of Greyhound bus caught in flood waters.

WATER, WATER EVERYWHERE!

Communications play major role in preventing loss of life as major storm strikes East Side of Cleveland.

by Robert E. Taylor, Cleveland, Ohio

To the casual observer in downtown Cleveland, that day was just hot and muggy. He noticed on his way back from lunch that a thunderstorm was moving just south of the downtown area, but he didn't get wet going back to work. In fact, until about three o'clock that afternoon he wouldn't have even believed a person who told him that the exclusive Shaker Square shopping area was under two to three feet of water . . . just five miles from downtown Cleveland. Nor would he have believed that Meadowbrook Blvd., an old streambed in Cleveland Heights was a raging torrent five feet deep, tearing miles of pavement to shreds . . . that students were being kept in schools until the emergency abated in 13 suburbs . . . that the Shaker Lakes had overflowed Coventry Road between Shaker and Cleveland Heights to a depth of six feet . . . that the Van Aken and Kinsman shopping areas of Shaker were accessible only by boat . . . that thousands of cars were caught so fast by the swiftly rising water the occupants barely had time to abandon them.

No, he wouldn't believe these things until he read the first reports in the afternoon papers — but they happened! Here is a story of fire department action in these dramatic hours.

ON MONDAY, June 1, 1959, a sudden, violent rainstorm hit Cuyahoga County in northeastern Ohio. Within three hours, from Bedford, Maple Heights and Warrensville Heights, southeast of Cleveland, to Lyndhurst, Beechwood and South Euclid, close to Lake Erie, rain and flash floods caused millions of dollars worth of damage.

The weather bureau estimated rainfall at over three inches. Others estimated the fall at eight inches. But, as there are no "official" stations on the East Side, no one will ever know just how much rain fell.

Quickly a state of emergency was declared in city after city; but most fire departments in the area were already working so hard they didn't worry about what was declared. They had a job of rescue to do and they did it.

Space does not permit detailed coverage of the fine work done by the departments, nor reporting of the hundreds of distress calls. As Chief Frank L. Veasley of the Cleveland Heights Fire Department said, "Cars on Meadowbrook were floating like ping-pong balls, the current was so fierce. We shut off the gas in hundreds of homes in addition to answering 18 specific runs."

In Shaker Heights, Chief Merle Hand's department had so many calls of flooded basements, streets and homes that, in addition to mutual aid from the city of Euclid, the 107th National Guard was called out. In adjoining Beechwood, Mayor Hopwood told me, "It sounds like just about the whole place is floating."

Throughout the growing emergency, three-way radio paid off in coordinating available manpower. As old streambeds, roads, backyards and sewers became rivers, whole sections of cities were cut off and isolated. The storm struck hardest from 1 P.M. to 3 P.M.

This area has gently sloping land — what most people would call flat. Yet, by 4 o'clock, water was rushing in torrents into Cleveland proper. Water from Shaker Square completely washed out tracks of the Rapid Transit at E. 93rd Street. Men in the Shaker Rapid Repair Shop at E. 71st Street had to make a mad dash to save the cars.

The full brunt of the run-off and storm was caught in the Cedar Glen-University Circle area of Cleveland. This is roughly ¾ of a mile long and is the home of Case Institute of Technology, the Art Museum and Severance Hall. Normally, waters flow quietly under the area in covered Doan Brook.

Shown in upper center of picture is Cleveland Transit System bus almost completely submerged. Flood waters here are at their height. All occupants of the bus have been removed.

At 3:19 P.M. Battalion 8, under the direction of Battalion Chief John F. Eble, was ordered to respond to an emergency location at the foot of Cedar Hill behind Case Tech. On arriving at the scene the men responding quickly sized up a vast sea of "emergency."

Battalion 8, Engine 10 and Hook and Ladder 8 responded. They first checked to be sure the rapidly filling Observation Elementary School had been completely evacuated. They then made a quick search for a small boat they had seen at a fire earlier near the Stearns Road, Carnegie Avenue intersection where they were. At 3:31 P.M. they radioed the fire alarm office that a boat was needed and that a Greyhound bus was roof deep in water about 1,000 feet from their location. Nine people were marooned on the top of the bus.

Men from Engine 10 and Ladder 8 went into waist-deep water and improvised a raft from a shed floating by. This they maneuvered to within 50 feet of the bus before it broke up. Two men were on the raft. Fireman Christy Harrold reached the bus on part of the raft while Fireman Daniel Gresky swam to the bus in heavy current.

While this was going on, Assistant Chief Frank J. Cooney, Acting Chief of the Cleveland Fire Department in the absence of Chief Elmer M. Cain, was on his way to the scene. He heard Engine 10's request for a boat and at 3:32 P.M. radioed the fire alarm office to dispatch by supply trucks two newly acquired boats from Cleveland Fire Boats 15 and 21.

At 3:40 P.M. the U. S. Coast Guard, Ohio National Guard 107th Cavalry, Civil Defense, Red Cross were notified of the need for boats and response was asked for by the Fire Alarm Office. At 3:47 P.M. Asst. Chief Cooney asked that the "Chief Granger," the Field Communications Truck, be dispatched to the scene. The Shaker Heights Fire Department called to offer a boat which Captain Hradek, of the Alarm Office, accepted promptly.

By this time the first of the fire department's small boats was launched by Supply Truck Driver Anthony Petek and the Assistant Chief's Aide, William Ruddy. They went to the swamped bus and, with the help of other firemen and rescuers, removed seven people from the roof, two to a trip. At 4:03 P.M. Rescue Squad 3 and Hook and Ladder 11 were sent to the scene.

The Fire Alarm Office, in addition to dispatching the "Chief Granger," also sent a large line truck, a small line truck, a trouble truck, and a box tester's truck. A loudspeaker on the Equipment Superintendent's car was used until the "Chief Granger" arrived. These units went to work setting up guide lines for the small rescue boats in the swift water, assisted in various rescues, set up five motor generators in the area for portable floodlights, and hooked up a special telephone connection from the Case Tech Physics building to the "Chief Granger" communications truck.

Pulleys, power winches, slings and other heavy equipment carried by the signal service trucks were put to good use. Captain L. J. Hradek, of the Fire Alarm Signal Office, stayed on the scene to direct the operations of his men.

An additional call at 4:04 P.M. for more help now brought help from all sides. Shaker Heights, with all of its own troubles, sent a boat and Engine 2 to the scene. Boats from the Coast Guard, a DUKW from the

(*Continued on page 26*)

This cave-in occurred when flood waters raced over the dam created by Euclid Avenue in front of the Cleveland Art Museum. Severance Hall, in background, is home of Cleveland Orchestra.

SURVEY OF
STATE AND PROVINCIAL FIREMEN'S TRAINING
— 1959 —

SEVERAL trends are evident in this year's report of State and Provincial Firemen's Training. One is that there has been no letup in the need for such training and no lessening of interest on the part of fire department members. Also evident is the prevalence of training in handling liquefied petroleum gas fires and radioactive materials. It will be noted in the reports on the following pages that a number of state training programs included these subjects.

More important, perhaps, is the fact that many of the states already have reported their plans for widening the scope of training activities. Arizona, Illinois and Missouri are working for training centers. Maryland plans a half-million dollar expansion and, of course, the University of Michigan and the Ontario Fire College are reaping the benefits of their new facilities.

As in previous years, the survey of firemen's training reported on these pages includes only the training programs conducted with the support of various Departments of Vocational Education or through the offices of the State or Provincial Fire Marshals. It does not include the thousands of other fire fighters who received training in individual fire departments, through county organizations or through schools and annual meetings conducted by fire chiefs and firemen's associations.

The over-all total of 135,926 firemen trained in the United States and Canada is the largest ever recorded in these surveys.

TOTAL FIREMEN RECEIVING TRAINING
(State and Provincial Programs Only)
Year Ending June 30, 1959

State		State	
Alabama	190	New York	12,600
Arizona	157	North Carolina	3,368
Arkansas	5,829	Ohio	5,931
California	6,534	Oklahoma	2,992
Colorado	7,949	Oregon	1,934
Connecticut	450	Pennsylvania	11,440
Florida	2,212	South Carolina	1,124
Georgia	2,658	South Dakota	439
Idaho	297	Tennessee	738
Illinois	7,658	Texas	3,315
Indiana	2,099	Virginia	1,950
Iowa	4,677	Washington	14,045
Kansas	1,348	West Virginia	605
Kentucky	2,305	Wisconsin	4,994
Louisiana	328		
Maine	1,845	Total U. S.	129,086
Maryland	3,020		
Michigan	3,244	B. Columbia	1,544
Minnesota	2,516	Ontario	2,524
Mississippi	97	Saskatchewan	2,772
Missouri	2,980	Total Canada	6,840
Montana	3,213		
Nebraska	2,005	Gr. Total	135,926

Alabama: Ward L. Rickard, Assistant State Supervisor, Trade and Industrial Education, reports that firemen's training in Alabama was confined to the 23rd Annual State Fire College where 190 fire fighters received training. The men requested instruction in the use of new extinguishers and handling of LP-Gas.

Arizona: William R. Woodfin, Supervisor, Industrial Education, reports that 157 men were trained at the Sixth Annual Fire Training School in Phoenix. Jake Siken, Supervisor of Training, Phoenix Fire Department, directed the three-day school which featured training on several new subjects including turbo jet fuel hazards, TV picture tube implosions and combustible metal fires. Various members of the fire service spoke on these and other subjects. A special course held for fire chiefs and officers in industry emphasized LP-Gas, flammable liquids and aircraft crashes. The Phoenix Fire Department submitted plans to the Office of Civil Defense and Mobilization for the construction of a training center in Phoenix.

Arkansas: Whit Murphy, State Fire Instructor, reports that 5,829 fire fighters received training last year. Fifteen regional schools were conducted for 1,848 men from 151 fire departments. Salvage and overhaul practices were the main subjects covered in addition to civil defense. Eight area instructors provided 22 training courses for 16 fire departments. A three-day teacher-training school was held for instructors and had an enrollment of 78 men from 51 departments. Departmental training covered 160 courses in 74 departments and had a combined attendance of 3,172 men.

British Columbia: Henry K. Jenns, Deputy Fire Marshal, reports that a total of 1,544 fire fighters received training including 89 paid men, 1,422 volunteers and 33 auxiliary firemen. A new orientation course for local assistant fire marshals was started this year and had an attendance of 100 in three sessions. Classes were also held in radiation hazard control and civil defense rescue. New equipment used in the provincial training program this year included a combustible gas indicator and a radiation survey meter.

California: Thomas S. Ward, Supervisor of Fire Training, State Department of Education, reports that 6,534 officers and men received training last year. The Sixth Annual Fire Training Officers' Workshop was held in Fresno in cooperation with Chief Gayle V. Coger and his fire department. One hundred and eighty-nine officers attended the five-day program which covered basic and advanced instructor training, organization for instruction and personnel development.

For the sixth year the Annual Arson and Fire Investigation Seminar was held on the campus of the University of California with 228 arson investigators, fire marshals and other officers in attendance. Classroom discussions and actual demonstra-

Fire fighters in Pueblo demonstrate dry line pick-up. Each member of hose company takes one length of hose at coupling, goes 25 feet toward fire, laying the hose in accordion fashion, as shown here, and immediately picks up folds and places them on right shoulder. Each fold of hose should be short enough to avoid dragging on the ground.

tions followed by individual investigation reports highlighted the five-day program. (The Seventh Annual Arson and Fire Investigation Seminar will be held at the University of California at Berkeley, June 13–17, 1960.)

Colorado: E. W. Crawford, Supervisor, Firemanship Training, reports that itinerant instructors trained 5,060 fire fighters, while 536 officers and men attended the 26th Annual State Fire School. At other area training schools and classes throughout the state 2,333 men received fire prevention and protection instruction. A special 30-hr. course in radiation was held for fire department officers who are also vocational instructors.

Industrial fire training included two 60-hr. courses in protecting equipment against fire and water damage. Fire prevention training was given to inmates in several correctional institutions and fire brigades were established there to continue this training. Courses in officer training are planned for this winter.

Connecticut: Roy W. Adams, Director, Public Service Training, reports that 450 fire fighters attended the 18th Annual Fire College, June 8–12, held at the New Haven Firemen Training Grounds. Conferences for fire officers and fire marshals were held at the University of Connecticut in April. Special courses in radiation hazards and aircraft fire and rescue were added to the regular curriculum at the fire college.

Florida: W. H. Barnett, Superintendent, Florida State Fire College, reports that a total of 2,212 men enrolled in the various classes and programs of the 30th Annual State Fire College. One hundred and fifty-seven fire fighters registered for the 30-hr. resident classes and thirteen enrolled in the 30-hr. field classes. Sixty itinerant classes of fifteen hours each attracted 1,415 firemen. The annual Florida Arson Seminar attracted 127 persons while 37 attended the class in liquefied petroleum gas. A special one-day demonstration of aircraft crash fire fighting was held during the Annual Florida Fire Service Training Improvement Conference. A special class on heating and air conditioning is scheduled for next May.

ANNUAL STATE-WIDE FIRE SCHOOLS
1958

State	Firemen Attend.	No. Years Held
Alabama	190	23
Arizona	157	6
Arkansas	—	13
Colorado	556	26
Connecticut	450	18
Delaware	—	11
Florida	157	30
Georgia	319	8
Idaho	236	10
Illinois	685	35
Indiana	186	35
Iowa	473	35
Kansas	—	29
Kentucky	643	25
Louisiana	112	4
Maryland	314	26
Michigan	450	31
Minnesota	275	31
Missouri	304	—
Nebraska	977	22
North Carolina	581	30
Ohio	150	14
Oklahoma	180	26
Pennsylvania	458	20
South Dakota	439	30
Tennessee	98	16
Texas	983	30
Virginia	—	13
Washington	691	28
West Virginia	208	28
Total	10,272	

Georgia: Thomas H. Quigley, Industrial Education Department, Georgia Institute of Technology, reports that 2,658 fire fighters received training last year. Fourteen fire departments sponsored local training classes with a total attendance of 375. Classes conducted by area coordinators attracted 825 fire fighters while state and zone fire schools gave fire protection training to 1,458.

Idaho: Chief Steve Taylor of Boise reports that 297 firemen received training last year. Two hundred and thirty-six men attended the 10th Annual State Fire School. Special courses were held in aircraft crash landing, first aid, rescue and hospital evacuation in addition to a command school. Industrial fire service training was given in fire prevention and evacuation.

Trainee on aluminum extension ladder at Kentucky Fire School.

Illinois: J. I. Fetters, Extension Specialist in charge of Training, reports that 7,658 fire fighters received training through the state program last year. The 35th Annual Fire College drew 685 firemen while other training schools had a total attendance of 713.

Thirty-hr. short courses were held for fire training instructors, inspectors and pumper operators while four three-hr. refresher courses were given for fire officers. New training classes gave instruction to apparatus drivers and aerial ladder operators. Plans are being drawn up now for a training center which will include facilities for fire control tests in dwellings and mercantile buildings.

Indiana: Professor Shelby Gallien, Director, Indiana Fire Service Training Schools, Purdue University, reports that 2,099 fire fighters participated in the state training program last year. The 35th Annual State Fire School attracted 186 firemen. Special training schools were held for Atomic Energy Commission instructors, fire inspectors, fire instructors and fire administrators. Two hundred and fifty-two men attended the Arson Investigators' Seminar while the Industrial Fire Control Conference attracted 82. The latter training schools included field trips to three industrial plants. New instruction was given this year in LP-Gas fires and jet fuels.

Iowa: Keith Royer, Supervisor, Firemanship Training, Iowa State University, reports that 4,677 fire fighters received an

(Continued on next page)

An advanced fire fighting class at the Pennsylvania Fire School in Lewistown where 11,440 firemen received training this year.

(*Continued from page 21*)

average of 10.8 hours of instruction in the state training program. During the 35th Annual State Fire School in June, 473 firemen attended the various training classes and represented 134 Iowa towns and nine other states.

Short courses were held during the past year for fire inspectors, fire department instructors, radiological monitoring instructors and on industrial fire safety. County and departmental fire schools plus volunteer fire department officer classes reached a large part of the 17,000 volunteer firemen in Iowa.

Kansas: Clyde A. Babb, Director, Kansas Fire School, reports that 1,348 fire fighters received training through the state training program. The 29th Annual State Fire School featured classes in pump operation, breathing equipment, officer training, inspections, aerial ladders and salvage. Two fire control tests were conducted during the four-day school.

Kentucky: J. L. Thompson, Chairman, Fire School Committee, reports that 2,305 fire fighters received training last year with 643 in attendance at the 25th Annual State Fire School. A new 10-hr. class in Arson Investigation proved very popular and had an enrollment of 91. Another new class on rescue techniques drew 34 students. On the county level of fire training were two 20-hr. courses for fire prevention training officers and drill officers.

Louisiana: Frank E. Domma, Superintendent, Louisiana State Fire College, reports that 328 firemen received training last year, including 112 who attended the Fourth Annual State Fire School. An officers' training school and advanced pump class are being planned.

Maine: Nelson Ingalls, Supervisor, Fire Service Training, reports that state-wide training reached 1,845 fire fighters last year. Twenty-seven instructors attended the five-day instructors' school. A one-day clinic in industrial fire brigade training was held in Lewiston.

Maryland: Robert C. Byrus, Director, Fire Service Extension, University of Maryland, reports that fire service training was given to 3,020 fire fighters and officers last year. The 26th Annual State Fire School attracted 314 men while other training schools held throughout the state had a total attendance of 943. A six-months series of officer training conferences was held at six locations in the state. New classes were held in radiation monitoring and industrial fire protection in addition to an automatic sprinkler school and an aerial ladder short course.

Industrial fire training and protection were featured at a three-day short course at the University and at four regional training schools. Future plans include a $500,000 construction program.

Michigan: Francis Hartman, Supervisor, Firemanship Training, reports that 3,244 firemen received training in a state-wide program that includes six categories: town fire schools, industrial fire control program, regional fire schools, specialized schools, state-wide conferences and training schools, and talks and lectures. Town fire schools are conducted by the Extension Service's full-time instructors and by part-time fire department instructors. The men are trained to work with their own equipment under conditions which may be expected locally. Last year, 900 fire fighters were trained in these local schools.

Six regional fire schools were held for fire departments within a 50-mile radius. Last year, 887 firemen from 69 fire departments received training. A Fire Prevention School had an attendance of 325. The 31st Annual Fire College attracted 450 paid, volunteer and industrial fire fighters last year. Seventy-five instructors attended the 30-hr. 11th Annual Fire Department Instructors' Conference. An Arson Control Seminar, held at the request of the Michigan Fire Chiefs' Association and the Michigan State Police had an enrollment of 153. Sixty-four chief officers received administrative training at the fire chiefs' training conference. A two-

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day state-wide industrial fire control seminar gave 12 hours of training to 210 men. A one-day fire safety seminar was held at the University of Michigan and had an attendance of 130.

A highlight of Michigan's fire service training program was the dedication and formal opening in March of the Civil Defense and Disaster Training Center on the University of Michigan campus in Ann Arbor.

Minnesota: E. L. Weber, Assistant Commissioner, Fire Marshal Department, reports that 275 fire fighters attended the 31st Annual Fire School while regional fire schools had an approximate attendance of 2,000. Altogether, 2,516 men received training last year through the state fire training program. Radiation hazard courses were conducted in cities with drill schools. The Minneapolis Fire Training School is experimenting with fog nozzles attached to cellar pipes to develop more effective control of basement fires.

Mississippi: J. W. Browne, State Supervisor, Trade and Industrial Education, reports that 97 fire fighters received training through the state-wide program last year.

Missouri: W. Bush Walden, in charge of firemanship training at the University of Missouri, reports that 2,980 fire fighters received training last year, with 304 attending the annual state fire school. Special training courses were held in driver training, fire fighting techniques and officer training. The Missouri state legislature appropriated funds to build a training center, fire station and drill tower on the University of Missouri campus.

Fire fighters at Kentucky Fire School extinguishing building fire during fire control test.

Montana: David Ballenger, State Fireman Instructor, reports that a total of 3,213 firemen received training last year. Ten courses of 18 to 60 hours were given to paid fire fighters while a 30-hr. course was offered to volunteers.

Nebraska: Howard Gorham, State Director, Trade and Industrial Education, reports that 2,005 fire fighters received training last year. The three-day 22nd Annual State Fire School attracted 977 firemen. William A. Berens, Chief State Fire Engineering Instructor, Trade and Industrial Education, reports that special training for firemen in mutual aid fire protection districts was given to 2,091 men in 205 towns. This course trained the men in actual fires where fire departments would work together. Fire control tests were conducted in six locations with 336 fire fighters from 28 towns participating in the demonstrations. Industrial fire training was conducted in two locations.

New York: George H. Proper, Jr., Deputy Director of Safety, reports that an estimated 12,600 fire fighters were trained through the state-wide program last year. Training classes were conducted in basic, intermediate and advanced fire fighting and in single company operations. Plans for the coming year include a pump operator's course and a course in arson detection for fire fighters. The entire state fire service training program is being revised at present and new courses are planned for the future.

North Carolina: Chief Charles L. Burkett of the Salisbury, North Carolina,

(*Continued on next page*)

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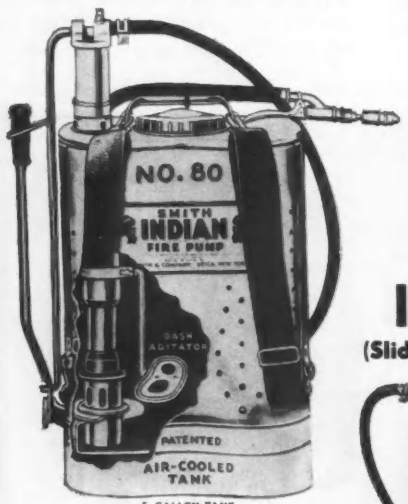

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(Continued from page 23)

Fire Department and Director-Conductor, North Carolina Fire College and Pump School, reports that 3,368 fire fighters were trained through the state-wide program last year. The 30th Annual State Fire College attracted 581 firemen while 142 attended the Fire Prevention Bureau school. Leading members of the fire service spoke at the fire college while various courses and demonstrations covered such topics as salvage, dry powder extinguishment and responsibilities of the fire service. A three-day pump school held for the sixth year was conducted in Charlotte.

Ohio: Byrl R. Shoemaker, Supervisor, Trade and Industrial Education Service, reports that 5,931 fire fighters and officers received training last year. One hundred and fifty attended the 14th Annual State Fire School. Fifteen regional schools provided training for 2,229 firemen while 137 officers were trained in ten different classes.

Oklahoma: Professor R. J. Douglas, Head, Fire Protection Department, Technical Institute, Oklahoma State University, reports that 2,992 firemen were trained last year. The 26th Annual State Fire School had an enrollment of 180. Additional training courses were held for instructors, fire inspectors and fire officers. Thirty-three fire fighters attended a two-day short course on fire prevention. Special fire control tests involving LP-Gas were conducted. Future plans include more district schools for volunteer and paid fire departments and an academy for rookie firemen.

Ontario: John Corfe, Public Information Officer, Office of the Fire Marshal, reports that 2,524 fire fighters received training last year. Regional fire schools were conducted at the request of the fire

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department and municipal council concerned and covered all basic fire fighting evolutions. Their total attendance was 150. Twenty-nine officers attended the administration course for senior officers, a three-week, 120-hr. course. This course is designed for officers who may be in line for promotion.

A County Mutual Aid Fire Forum attracted 30 county coordinators who attended classes on mutual aid fire programs. Thirty-three inspectors attended the five-day basic fire inspection practices course. A fire department instruction course had an enrollment of 27 while the same number of officers attended a course in atomic fire hazards in industry.

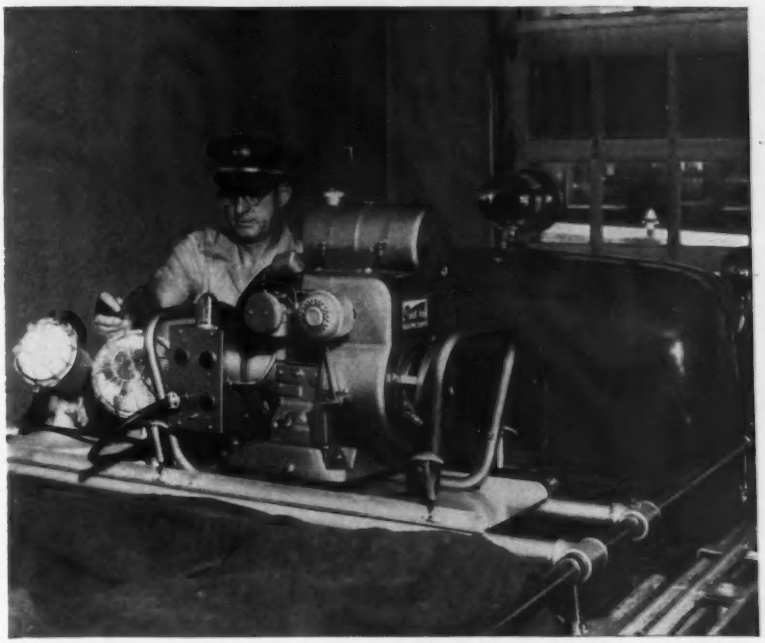
Oregon: Elmer H. Halstead, State Supervisor, Public Service Training, reports that a total of 1,934 firemen received training last year. Two arson investigation schools were held in addition to courses on pre-fire planning, responsibilities of officers, organization of volunteer fire departments, personnel and public relations. A new course on radiation hazards was also held. Three buildings were burned in fire control demonstrations to determine time control, water and temperature measurement. A nine-room school was also burned in a test to evaluate pre-fire planning and mutual aid response. Training in the use of hose lines, extinguishers, evacuations and inspections was given at the State School for the Deaf. Tentative plans call for a gas and oil fire school, the development of a staff of part-time instructors and an area chiefs' conference on fire department administration.

Pennsylvania: Arthur W. Espey, Supervisor, Fire Service Training, reports that 11,440 fire fighters received training in the state-wide program last year. The 20th Annual State Fire School attracted 400 men. A 15-week course on fire fighting fundamentals provided 87 training classes for 2,172 firemen while county and regional fire schools had an enrollment of 8,001. Eighteen resident classes had a total attendance of 321. Special one-and three-day programs held at the state fire school in Lewistown attracted 488.

Saskatchewan: A. Dron, Deputy Fire Commissioner, reports that 2,772 fire fighters received training last year. Of this number, 657 firemen attended 30 volunteer training schools. Fog and straight stream nozzles were used on various fire control tests to show their value to the volunteers. Three fire prevention programs were held at Saskatchewan University and had a total attendance of 180. Seven civil defense fire training courses had an enrollment of 192 while the same number of Royal Canadian Mounted Police training classes attracted 271. Four hundred attended four high school warden special fire training courses and 21 fire department instructors received training in a special program.

(*Continued on page 36*)

Onan NEWS REPORT



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Water, Water Everywhere

(*Continued from page 19*)

107th Cavalry and heavy line equipment from the Cleveland Transit System and men from Civil Defense responded. Clothing came in with the Red Cross.

The water reached the top of the roof as the last of the people were taken from the top of the Greyhound bus. Just then, a Cleveland Transit System 7A bus coming down Cedar Hill, now a river, entered the flooded area and was literally swept into deep water. Had it not lodged against a small tree the bus and passengers would likely have been carried into water over the roof or tipped over and all occupants drowned. Firemen, Coast Guard and Case students went to the rescue. The water was so deep escapees had to duck under water to get out of the bus. Asst. Chief Cooney directed by radio that a rope be extended to the C.T.S. bus from shore, a distance of about 400 feet, as an additional safeguard for the rescue boats working in the heavy current. Fireman Kellum, who had worked on the Greyhound bus, this time aided in removing five of the fourteen passengers from the bus. Swimming underwater he also made a search of the inside of the bus for a baby supposedly on board. There was none. As people were rescued from this bus they were blanketed by Rescue Squad 3 and sent to Lakeside Hospital for observation. One was aged 77.

At 4:21 P.M. Assistant Chief Cooney had Engines 29 and 34 dispatched to cover isolated areas in case of fire or other emergency calls. At 4:45 P.M. Hook and Ladder 17 was sent to cover a major cave-in on Euclid Avenue at one end of the lake.

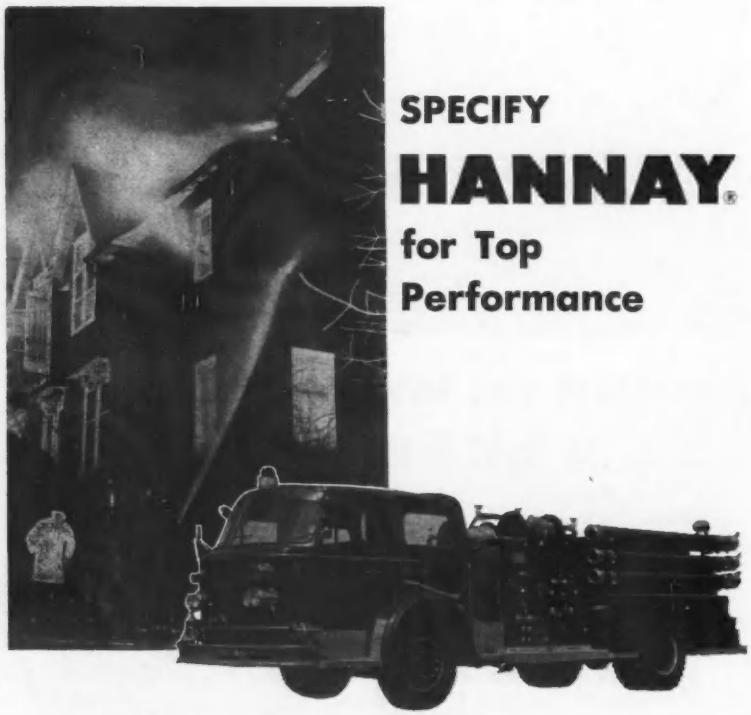
It now became apparent the water over the area was 10 to 12 feet deep and the Cultural Gardens along Euclid Avenue were acting as a dam. As the waters washed over this dam they rushed into a lake in front of Cleveland's Art Museum. A giant hole was washed through the Cleveland Garden Center's quarters on the banks of the Cultural Gardens. This area was roped off and all traffic was closed on Euclid Avenue.

In fact, all normal routes to the Heights area were closed. Traffic by rush hour was rerouted effectively by police.

In the center of this sea were two apartment buildings, one four story and one three. Because of a possible fire or other emergency in these apartments, Asst. Chief Cooney ordered them evacuated. Twenty persons were removed from second story windows by the National Guard DUKW.

As darkness settled over the area, the area had been cleared of persons and the waters began to subside slowly. By midnight some companies began returning to quarters. By dawn, mop-up operations had begun to get under way.

Cleveland's Asst. Chief Frank J. Cooney summed up the story by saying, "I am convinced that the miracle of no lives lost in this flash flood was attributable to the speed with which the small boats of the fire department were brought to the scene of the first bus. It was



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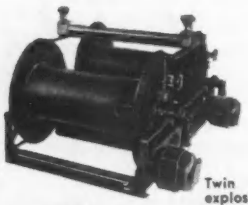

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the result of the action of the men of Engine 10, Hook and Ladder 8, Squad 3, the Assistant Chief's Aide and the Supply Truck Driver, who without regard to themselves, made every human effort to reach the victims. The Fire Alarm Office crew, under the direction of Captain Hradek, acted as a rescue unit with outstanding results, especially since radio communications at the time were very heavy. Effective cooperation by Police, Fire, Coast Guard, Civil Defense, National Guard and Red Cross Units all teamed for a successful operation. Shaker Heights' dispatch of a boat and pumper under the direction of Captain Harrison was a great help. Battalion Chief John Eble, in command of the 8th Battalion, rendered supervision of the highest order. Fifteen of the firemen have been recommended by me to Chief Elmer M. Cain for meritorious action."

Dates to Remember

Indiana: The Second Annual Fire Management Course will be held at Purdue University, December 1–2. Write to Professor Shelby Gallien, Director, Public Safety Institute, Purdue University, Lafayette.

Maryland: The Fire Chiefs' Association of Maryland will hold its meeting at the Earleigh Heights Fire Department, Severna Park, Maryland, November 21. For details, write to the secretary, Chief Charles Burton, 4100 71st Avenue, Landover Hills.

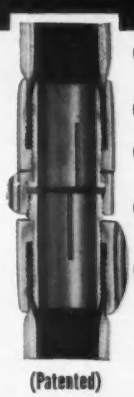
Pennsylvania: Special training courses will be given in ladder, rescue and salvage, November 16 and in fire department officership, November 30. Write to Art Espey, Director, Pennsylvania State Firemen's Training School, Box 631, Lewistown.

South Carolina: Fire service training classes will be held in Taylors, November 16–20; Elloree, November 30–December 4; and Charleston, December 7–11. For further information, write H. B. Wells, Instructor, Fire Fighting Training, 1539 Harrington Street, Newberry.

Tennessee: Instructor training will be given at the Tennessee State Fire Training Center in Murfreesboro, December 2–4. For further information, write to Homer S. Elkins, Instructor-Coordinator, Fire Service Training, 215 Chestnut Street, Chattanooga.

California Fire and Arson Investigation Seminar

The Sixth Annual Fire and Arson Investigation Seminar was held at the Los Angeles campus of the University of California recently. It is conducted in cooperation with the University Extension, University of California and the California Conference of Arson Investigators. Shown above are the 228 arson investigators, fire marshals, fire department officers and other persons from nine states who attended. Next year's seminar will be held on the Berkeley campus of the University of California, June 13 to 17.



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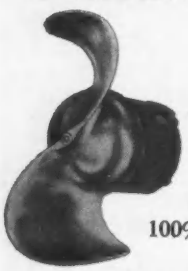

NOT JUST A FAN... but a powerful vacuum-action air screw... Super Vac is amazingly simple in operation, made possible by the efficient design of the **powerful propeller** that is the heart of the unit. This patented propeller produces 100% pulling or blowing power over its entire surface.

Proved method of saving lives while also reducing smoke damage

Fire departments **nation-wide** attest to the speed with which Super Vac provides **controlled ventilation**... so necessary in modern fire fighting. This multi-purpose unit primarily (1) gets rid of smoke and fumes through its powerful vacuum action... or, (2) furnishes a tremendous blast of fresh air into the smoke-congested area, reducing the dangers of combustion and asphyxiation. Although one unit is often sufficient, **complete controlled ventilation** can be more speedily accomplished by using two or more units... one or more units **pulling out the smoke and fumes** while the remaining units **blow in a steady supply of fresh air.**

★ **Highly portable... operates in any position**
★ **Design permits vertical stacking**
★ **Made in 16" and 24" sizes**
★ **AC or DC, regular or explosion-proof motors**
★ **Choice of red or white baked enamel finish**
★ **Running board mounts available**

For complete details and specifications on

... contact your fire equipment dealer

... or write manufacturer

SUPER VACUUM

SUPER VACUUM MANUFACTURING CO., Inc
319½ East Seventeenth Ave., Denver 3, Colorado

New Massachusetts Organization

FIRE department officers and instructors in Massachusetts recently formed a new organization. Called the "Institute of Fire Department Instructors," it will be a state-wide association of fire department instructional and training personnel. Officers elected at the first meeting on September 30 were: Assistant Chief Timothy J. Herlihy, Newton, president; Deputy Chief J. C. Mullins, Cambridge, 1st vice president; Captain J. G. Binney, Hingham, 2nd vice president; and Captain Philip A. Renta, Brookline, secretary-treasurer.

Meetings of the new association are scheduled to be held quarterly. The September meeting was at the training school of the Brookline Fire Department, but future meeting sites will be in various locations in Massachusetts.

Got Your Entry Ready?

HUNDREDS of entries for the 1959 Fire Prevention Contest are coming into the NFPA Executive Office. Altogether, about 1,600 entries are expected from the United States and Canada. Municipalities, industry, military posts and government installations are eligible to participate.

All entries must be submitted by November 30. Judging will take place in December and the winners will be announced in January. For entry blanks and detailed information on the Contest, write to the NFPA Public Relations Department.

FOR SALE

1948 Ford Fire Truck

6 x 6 all wheel drive, with new Barton-American 500 GPM front end pump (4" inlet plus 2½" gated inlet), 500 gallon tank, two pre-connected booster reels, and ten new mud and snow tires. Other equipment standard.

Write or phone:

John C. Hunsinger, Chief
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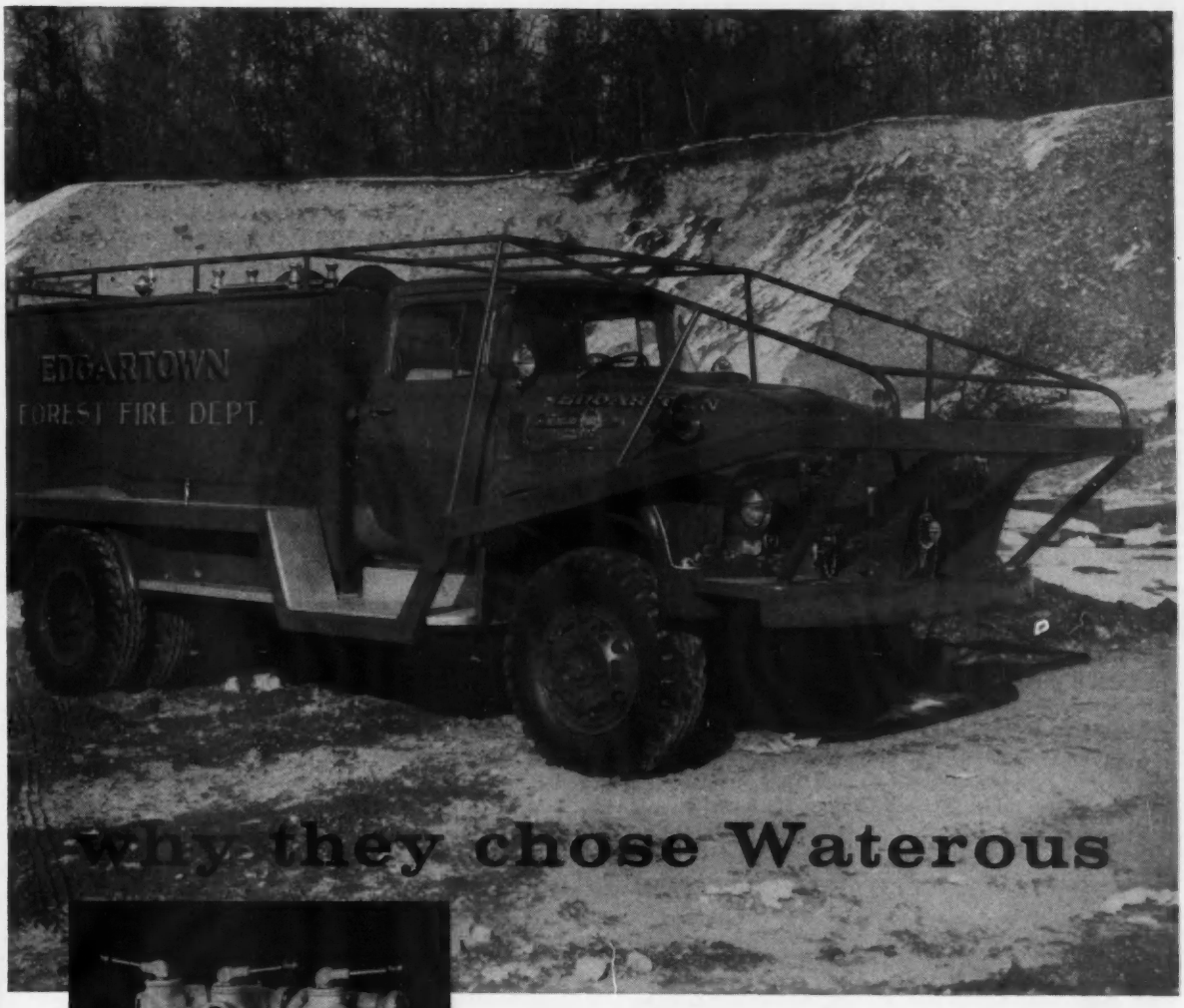
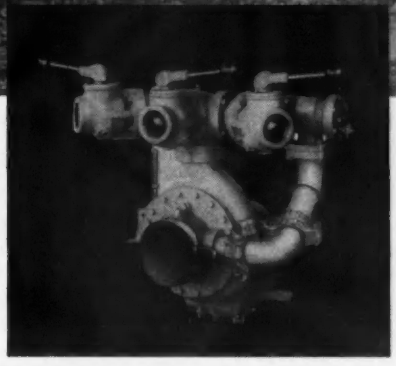
1391 Duncan Avenue
Pittsburgh 37, Pennsylvania



why they chose Waterous



Model CF-4 pumps more gallons per minute than any other service-proven, front-mounted pump

WATEROUS' front mounted CF-4 has a 750 GPM Class A Fire Underwriters' rating. Its three 2½" lines for structural fires are recommended by underwriters for many communities.

The CF-4 is a simple, compact unit that can be front mounted on any standard truck chassis. Its impeller shaft assembly is ball bearing-mounted — hydraulically and mechanically balanced to operate smoothly over its entire range — makes use of the truck engine's coolant for winter heating. An over-center, single-plate dry clutch permits positive engagement or disengagement at any engine speed. It's just like the clutch in the truck itself.

Where the advantages of a front-mounted pump are desired, the CF-4 provides superior performance and unmatched reliability.

For complete information on the CF-4 and other WATEROUS fire pumps write:

WATEROUS *80 E. Fillmore Ave., St. Paul, Minnesota, Dept. 209*

Highlights in the History of

SELF-CONTAINED BREATHING APPARATUS

By George L. Morse, Product Line Manager, Oxygen Equipment, Mine Safety Appliances Company.

Conclusion of Part I which appeared in the October issue of FIREMEN in which Mr. Morse traced the history of self-contained breathing apparatus from the early nineteenth century. The following describes demand type breathing apparatus as we know it today.

H. FAYOL, in 1873, introduced a rather elaborate plan for supplying a number of miners with breathing air. Each man carried a reservoir of atmospheric air on his back, wore a valved mouthpiece allowing him to draw air from the reservoir and exhale into the mine. The air was stored under pressure and reached the wearer through a form of control valve. One of the men carried a distributing reservoir fed from an external pump, situated in fresh air at the mine base, and fitted with several nozzles, allowing other men to draw their air from it. They could at any time charge their reservoirs from this source, detach themselves and proceed independently.

Another device of the compressed air type consisted of a leather helmet lined with sheepskin, including the fleece, and fitted at the back with a small cylinder containing about 125 liters of free air compressed to 150 pounds per square inch. A valve and connection between the cylinder and the helmet fed the air into the latter, but as the pressure fell, it was obvious that the air would be delivered in gradually diminishing quantity, so that, when the wearer was nearing the end of his task — when he would most need his full air supply — he would be getting appreciably less. A test made with this helmet shows that its period of usefulness was only about five minutes when the wearer was walking at the rate of two miles per hour.

Another reservoir device consisted of a cylinder of compressed air or oxygen and a helmet or hood — sometimes attached to a jacket reaching the hips. The delivery of air or oxygen to the wearer was controlled by a hand valve used at his discretion. But sometimes, when engrossed with his work, he forgot to turn on the valve, with the result that his failure to introduce a fresh supply of air in time resulted in his losing consciousness through want of oxygen and the accumulation of carbon dioxide.

Demand type breathing apparatus as we know them today are the direct result of the development work on aircraft oxygen regulators done for the Bureau of Aeronautics, Department of the Navy, and the early Army Air Forces. While such regulators had a means of air dilution added to increase efficiency at lower altitudes they contained the same basic elements as the demand regulators used today in breathing apparatus. There is, however, one fundamental difference in the requirements such regulators must meet for aircraft usage and when used with self-contained breathing apparatus. It may surprise you to know that the demand regulators used on breathing apparatus must have much higher performance than those used for aeronautical purposes. The reasons for this are obvious when the difference in the requirements is analyzed. Aircraft regulators are used under conditions where maximum physical exertion is not expected, and, therefore, unlike breathing apparatus regulators do not require exceptionally high flow capacity. Secondly, the higher an aircraft ascends the less dense the air becomes and the greater the rate of oxygen flow through the same orifice. Thus a demand regulator will, for all practical purposes, double its flow at 18,000 feet as contrasted with sea level. Although this is not of significance in breathing apparatus, the service life of the oxygen supply will be double.

The exact opposite is true, however, when one goes to pressures greater than atmospheric as in descent into

FYRUMBRELLA enables men to stay right up there — no need to be "run out" by roaring heat! No more lurking behind pieces of metal, bed springs, doors, wetted down tarps or blankets.

● Five feet square, when open, the aluminized surface deflects 95% of the radiant heat. The tough **GLASS** cloth construction makes it non-burnable. Three men with 2½" lines and any type nozzles may work through the hose port. Adequate forward vision is provided by eye ports on each side. The **FYRUMBRELLA**, weight only 9½ lbs., folds compactly for easy storage in apparatus compartments. The **FYRUMBRELLA** combines an aluminized reflective surface on strong, non-burnable glass cloth backed by a coating of neoprene for greater strength. Hardware is of a rugged steel construction to withstand raps and bumps. Write for complete information on Fyrumbrella, other Fyrepel Fire Fighting Equipment and Heat Protective Clothing.

FYREPEL PRODUCTS, INC.
Dept. A Box 503 Newark, Ohio

water or in a caisson which is under pressure. Under these conditions the flow decreases as does the service life.

Demand regulators, as the name implies, deliver flow on demand of the user during inhalation and have the flow terminated during exhalation, with the exhalation passing to the atmosphere. Thus the exhaled oxygen is wasted instead of being reused after the exhaled CO_2 is removed as in rebreathing circuits. Also, the entire inhalation need of the user must be met by the flow from the demand regulator, there being no reservoir from which to draw as in the case of a breathing bag. This means that there must be high peak flow capacity to take care of maximum exertion even though the regulator is normally delivering a flow which is only a fraction of its capacity.

There are two conflicting desires which must be compromised when a demand regulator is designed. The first is for low breathing suctions to obtain flow and while this can be met, in part, by design ingenuity in the method of opening the demand valve for flow, it is aided materially by having a low pressure in the reducing valve chamber after the high pressure from the cylinder is reduced in the first stage. However, it is also desirable and actually mandatory to have a high rate of flow available, and this is accomplished most easily by having a high pressure in the reducing valve chamber since the flow through any orifice, in this case, the demand flow valve, is a function of the pressure exerted by the gas, the orifice being constant. The user must open this valve against the pressure in the reducing valve chamber and the higher the pressure in the reducing valve chamber the greater the resistance to its proper opening.

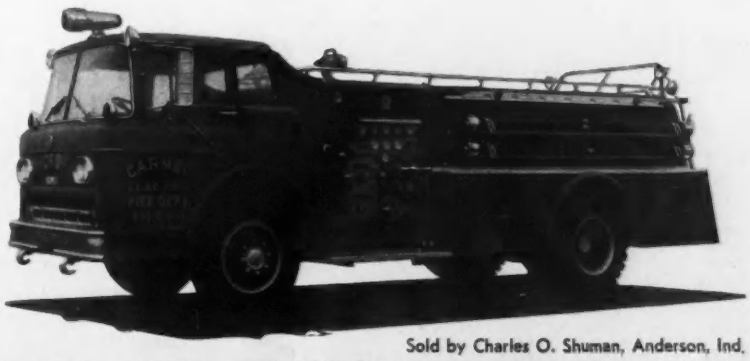
Demand regulators are evaluated for efficiency by what is known as suction-flow characteristics. This is divided into opening suction, or the inhalation effort required to open the valve and begin flow, and the inhalation effort required to get varying rates of increased flows. The so-called "limiting" flow is not necessarily the maximum flow that a regulator will deliver but rather the maximum practical flow, since resistance to inhalation will build up gradually and in a generally uniform pattern until there is a sharp upward break. The point of break is the limiting flow, although a slight flow increase can be obtained by an excessive additional inhalation effort.

The oxygen cylinder rebreathing type apparatus has been in use for many years. Its design problems are well known and have been overcome so that it works in what is probably the most satisfactory manner. Briefly, here are the requirements: an adequate oxygen supply for the service time desired, adequate CO_2 retention in the scrubbing chemical under peak loads and for the full time of use, and a breathing bag of adequate capacity to insure that the user can obtain all the volume of oxygen he desires under peak

(*Continued on next page*)

The HOWE pumper pictured here was manufactured for the community of Carmel, Ind., and will provide adequate, powerful, effective, yet ECONOMICAL, fire protection for that area.

It is a 750 gallon pumper, with a 750 gallon booster tank; has 7 large compartments (4 side, 3 rear) for storage of portable pumps, generators, miscellaneous equipment, coats, etc. Equipped with fully Electro-Matic Waterous Pump, it also has electrically controlled hose reels, and the reel and pump are enclosed in heated compartment to prevent freezing.



Sold by Charles O. Shuman, Anderson, Ind.

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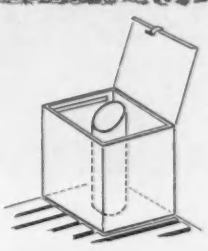
Let HOWE fire apparatus protect you!



'dependable fire apparatus since 1872'

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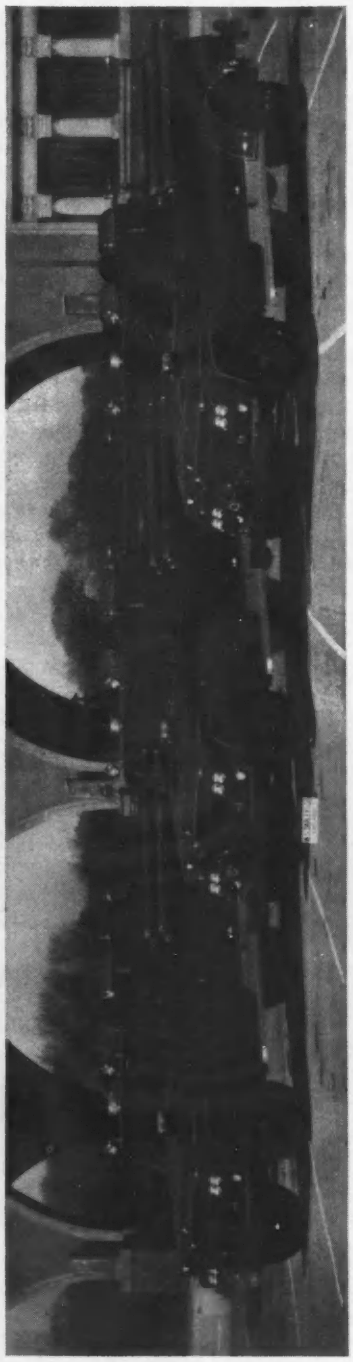
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loads and have adequate capacity for a full exhalation. Also, a suitable means of relieving excess breathing pressure is necessary.

In self-generating apparatus the problems are comparable except that an oxygen producing CO_2 retaining chemical replaces the oxygen cylinder CO_2 scrubbing chemical and the regulating valves. Dr. Schwann recognized the desirability of having a chemical which would provide oxygen, remove exhaled carbon dioxide and keep the inhaled oxygen dry to insure an absence of lens fogging. Such chemicals are well known and the best is KO_2 (potassium superoxide). When it was desired to use this chemical the problem was that it was not available except in small laboratory batches so a manufacturing method had to be devised. This was reported by Dr. C. B. Jackson and Dr. R. C. Werner.

Regardless of the efficiency of the various types of breathing apparatus available today, and in the future, they must be used by men who are thoroughly trained in their use and maintenance.

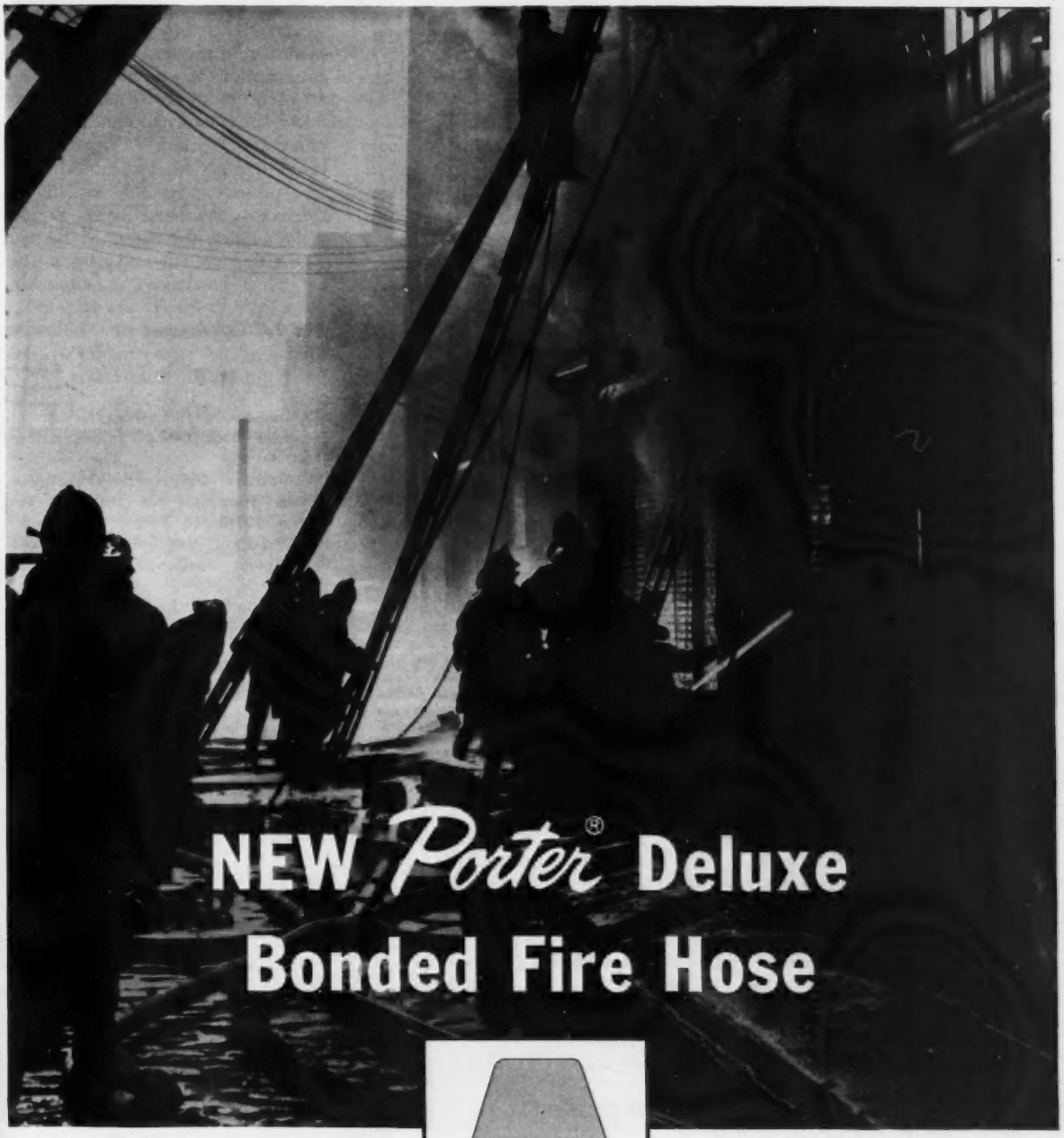
This means not only oral and written instruction, which is of major importance, but also actual wearing of the apparatus until it becomes automatic to put it on, test it and use it properly. If this training can be done in a gas or smoke chamber after the user is familiar with the fundamentals, the results can be expected to be better than if the training and wearing is solely in fresh air. It seems obvious that the equipment will be used under conditions which are toxic and frequently unpleasant in other aspects such as heat. Therefore, if the user has worn the equipment under such conditions, or the closest thing thereto that can be provided, he will have confidence in the equipment and will use it successfully. If his training is inadequate it will be only good fortune that the use of the equipment under actual emergency conditions is completely successful.

The same thing applies equally well to maintenance of the equipment to assure that it is in perfect operating condition when it is to be used. If it is not checked thoroughly periodically in accordance with an established plan there is always the possibility that it will not function properly. Establish responsibility and proper authority for training and maintenance and the dividends are many when the time comes for actual use of the equipment. Do not do so and the investment that you have made in equipment to provide proper protection may not only be wasted but may also result in property loss and jeopardy to the apparatus wearer.

Changing Address?

SUBSCRIBERS to FIREMEN magazine who plan to change address should notify the NFPA Executive Office promptly so they won't miss any issues of the magazine. Fire fighters who receive the magazine through fire chiefs' or fire departments' membership should also include this information when they send notification of their new addresses.

Recent changes in postal regulations require the inclusion of postal zone numbers on third-class mail. Fire chiefs and other department members who submit lists of FIREMEN subscribers in renewing membership are asked to include the postal zone number for each individual, if possible.



NEW *Porter*® Deluxe Bonded Fire Hose

. . . eliminates need for drying.
You don't have to stock spare hose for use while another load is drying. The new Porter Deluxe Bonded Fire Hose doesn't need drying-out.

It's made with a rubber bond between the two jackets of DuPont "Dacron" polyester fiber, which laughs at mildew. Pack it away soaking wet without the fear of deterioration that is common to cotton-jacket hose.

A rubber-bonded double jacket of "Dacron" all around is the secret behind the new mildew-proof Porter Deluxe Bonded Fire Hose.

And drag new Porter Deluxe Bonded Hose to test its scuff-resistance! At least five times more wear can be put on this remarkable hose before the two bonded jackets begin to show it.

Ask your Thermoid distributor to show you a length of the new Porter Fire Hose with the all-"Dacron" bonded jacket. Or write *Thermoid Division, H. K. Porter Company, Inc., Tacony and Comly Sts., Philadelphia 24, Pa.*

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PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

Plan Ahead!

THE greatest influx of NFPA new members and the greatest renewal of membership occurs in the first four or five months of each year. January, in particular, is one of the heaviest months for renewal. Under the established NFPA membership procedure, notices are sent at least two months in advance so that members can renew with a minimum of effort.

Since fire departments order the greatest number of subscriptions to FIREMEN magazine, this advance notice serves a useful purpose. The secretary of the department or the man who handles the membership has time to get the names of all members of the department who wish to subscribe to the magazine through the membership. Then, when the membership becomes due, this list is submitted and the multiple subscriptions to the magazine are obtained promptly and without interruption. Some fire departments order more than one hundred subscriptions in this manner.

So, if your fire department renews its membership in the early months of each year, now is the time to plan to get subscriptions to FIREMEN magazine for all fire fighters in the department. Simply make a list of the names of the men in the department and submit this list when you renew membership.

NFPA Welcomes the following chiefs and fire departments who recently joined the Association.

Arkansas: Magnolia Fire Department, Magnolia; West Helena Fire Department, West Helena.

California: Covina Fire Department, Covina; Humboldt No. 1 County Fire Protection District, Eureka; San Marcos-Richland-Twin Oaks Local Fire District, San Marcos; Pacifica Fire Department, Pacifica.

Colorado: South Adams Company Volunteer Fire Department, Derby.

Florida: Chief R. E. Insua, Cantonment Volunteer Fire Department, Homestead; Leesburg Fire Department, Leesburg.

Illinois: Chapin Volunteer Fire Department, Chapin; Glenview Volunteer Fire Department, Glenview; Forman Fire Protection District, Manito; Leyden Fire Protection District, Melrose Park.

Indiana: Gary Civil Defense Reserve Fire Force, Gary; Chief Norman Fesher, Terre Haute.

Massachusetts: Danvers Fire Department, Danvers; Marlboro Fire Department, Marlboro.

Michigan: Zealand Fire Department, Zealand.

Minnesota: Lester Prairie Volunteer Fire Department, Lester Prairie; Willmar Fire Department, Willmar.

New Jersey: Allendale Fire Department, Allendale; Town Bank Volunteer Fire Company, Inc., Cape May; Niagara

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The National Preparatory Institute offers a course of instruction in Fire Prevention, Fire Protection and Fire Fighting which will help you to improve your knowledge of fire field subjects and assist you in your studies for promotion.

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New York: Albertson Hook and Ladder, Engine and Hose Company No. 1, Albertson; Elmira Fire Department, Elmira; Fort Totten Fire Prevention and Protection Branch, Bayside; Pearl River Hook and Ladder Company No. 1, Inc., Pearl River.

North Carolina: Goldsboro Fire Department, Goldsboro; Jacksonville Fire Department, Jacksonville.

Ohio: Rittman Volunteer Fire Department, Rittman; Sandusky Fire Department, Sandusky; Twinsburg Fire Department, Twinsburg; Lordstown Fire Department, Warren.

Oregon: North Bend Fire Department, North Bend; Four Corners Fire Department, Salem.

Pennsylvania: Canonsburg Volunteer Fire Department, Canonsburg; Empire Hook and Ladder Fire Company, Hollsopple; Circleville Volunteer Fire Department, Irwin.

Quebec: Seven Islands Fire Department, Seven Islands.

South Dakota: Hecla Volunteer Fire Department, Hecla.

Tennessee: Cleveland Volunteer Fire Department, Cleveland; Chief Clyde Johnson, Dayton.

Vermont: Moretown Volunteer Fire Department, Moretown.

Virginia: Jefferson District Fire Department, Arlington; James City-Bruton Fire Department, Toano.

Washington: Moses Lake Fire Department, Moses Lake.

Wisconsin: Wauzeka Fire Department, Wauzeka.

New Home for Federal Sign and Signal Corporation

The new address for Federal Sign and Signal Corporation, manufacturers of Beacon Ray lights and Federal Class "Q" sirens, is 136th and Western Avenue, Blue Island, Illinois. Blue Island is a suburb of Chicago.

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Convert your spare time into steady income selling most popular line of Belts and Buckles with Fireman's personal initials, first name or nickname with miniature replicas of actual fire equipment beautifully enameled, also lapels, tie clasps, key chains, money clips, and cuff links. Excellent repeat business. We furnish you with FREE complete sales kit. Really nice part-time money producing items.

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in addition to the "regulation" models shown above, we manufacture other helmets, in drop-brim and other styles, in leather, aluminum and plastic, at prices to fit all budgets.

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Write for Catalog 360 showing everything a fireman needs for his personal equipment — together with Department Record Books, Secretary's Books, and printed forms.

CAIRNS & BRO., Inc. — Allwood, Clifton, N. J.

State and Provincial Firemen's Training

(*Continued from page 25*)

South Carolina: H. B. Wells, State Instructor, reports that 1,124 firemen received training in 43 weekly classes. New courses in the state training program covered radiation hazards and LP-Gas. Fog nozzles were used on five fire control tests conducted in Greenville. Plans for the future include the development of an instructors' and inspectors' school to be conducted in four one-week courses.

South Dakota: Francis W. Pyncheon, Secretary, South Dakota Firemen's Association, reports that 439 fire fighters attended the 30th Annual State Fire School last year. Several smaller district schools are also held throughout the year. A special class on fighting army aircraft crash fires was conducted in addition to a lecture on radioactive materials. A fire control test was held to demonstrate temperature changes and time control.

Tennessee: Homer S. Elkins, Itinerant-Coordinator, Firemanship Training, reports that 738 firemen received training last year with 98 attending the 16th Annual State Fire School. Twenty attended a fire department instuctors' course while twenty-four men received training on the legal rights and responsibilities of fire officers. Instruction in the use of fog nozzles was conducted on fire control test buildings and on a fire-resistive building. There have been requests for training on radioactive materials, new chemical fuels and school safety. Protective clothing was given to the fire fighters during the fire control tests to demonstrate its value against heat radiation. Future plans include a trained instructor in each fire department to provide year-round training.

Texas: Henry D. Smith, Chief, Fireman Training, reports that 3,315 firemen were trained last year in the state-wide program. The 30th Annual Firemen's Training School attracted 1,067 students. Industrial fire protection courses covered alkali metals, gas cylinder fires and other related courses. Instructors' and officers' courses were also held at the annual training school.

Itinerant training covered basic and advanced fire training, fire prevention and officer training. A total of 404 men representing 108 fire departments attended instructors' and fire prevention conferences while 94 firemen from 17 departments participated in regional training.

Virginia: R. Lawrence Oliver, Supervisor, Fire Service Training, reports that 1,950 firemen received training last year. In addition to the 13th Annual State Fire School, eight zone schools and an officer-instructor special course were held. Fire control tests were conducted involving LP-Gas and jet fuel. Two 30-hr. indus-

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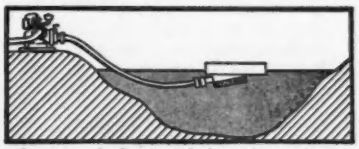
The new Float Dock Strainer makes most any stream or pond useable for fighting rural fires or for filling your tanker. Float Dock will draft in deep or shallow water — off the bottom and drafting always the cleanest water with never a whirlpool or loss of suction at any time. Saves wear on your pump, too.



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trial fire brigade schools were held during the year. Plans for the coming year include a radiation hazard school, a special instructors' course and enlargement of the fire training grounds.

Washington: Mrs. Emma L. Ethier, Secretary, Washington State Firemen's Association, reports that a total of 14,045 firemen received training with 691 attending the 28th Annual State Fire School. The fire training staff includes Lyle L. Goodrich, supervisor, and 31 part-time instructors from paid fire departments. A grain school to determine the best methods and equipment to use on grain fires and several pump schools were held throughout the year.

For the first time this year a command school was held in Yakima and proved to be so successful that another one is planned for 1960. This school was conducted for chief officers. Fire control tests included grain fires at Walla Walla and an oil fire in Bellingham.

West Virginia: R. E. Hanna, Jr., Assistant Director, Fire Service Extension, reports that 208 firemen attended the 28th Annual State Fire School while 71 enrolled at the Greenbrier Regional Fire School. Seventeen officers attended a special training school and 32 registered for the fire prevention inspection course. Altogether, a total of 605 fire fighters received training last year. Demonstrations using wet water foam were conducted at the state fire school.

Wisconsin: William E. Clark, Supervisor, Fire Service Training, reports that 4,994 men received training in 883 classes last year. Seventy-seven fire departments having 1,595 firemen participated in a 25-hr. in-station basic training course. Certificates of satisfactory completion were awarded to 1,087. Eleven short courses attracted 1,452 fire fighters while the same number of regional advanced fire protection schools had an enrollment of 1,403 men from paid and volunteer departments and industrial and public institutions. A Fire Prevention School, held for the first time last year, attracted 118 fire chiefs, inspectors and fire fighters. A short course in institutional fire fighting was held at the Wisconsin Home for Women where twelve employees passed the course satisfactorily. The state training staff issues a bi-monthly bulletin that is sent to every fire department.

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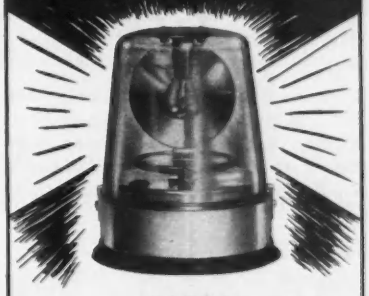

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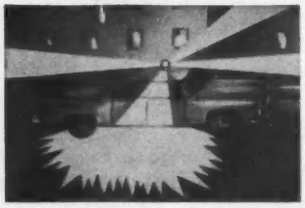

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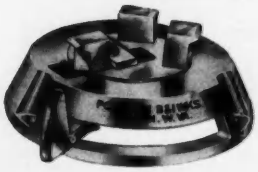

PLATE 234

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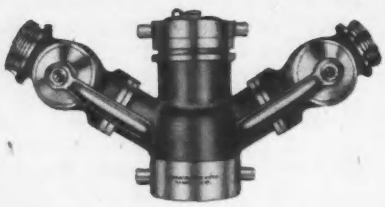

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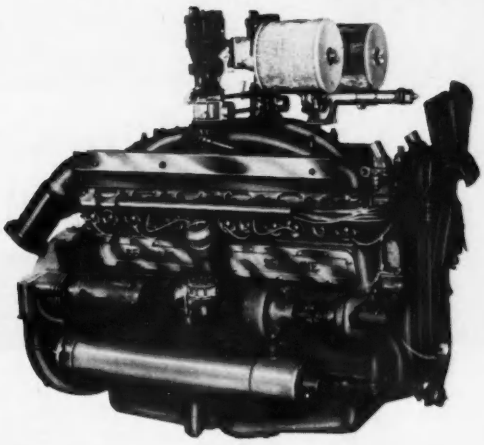

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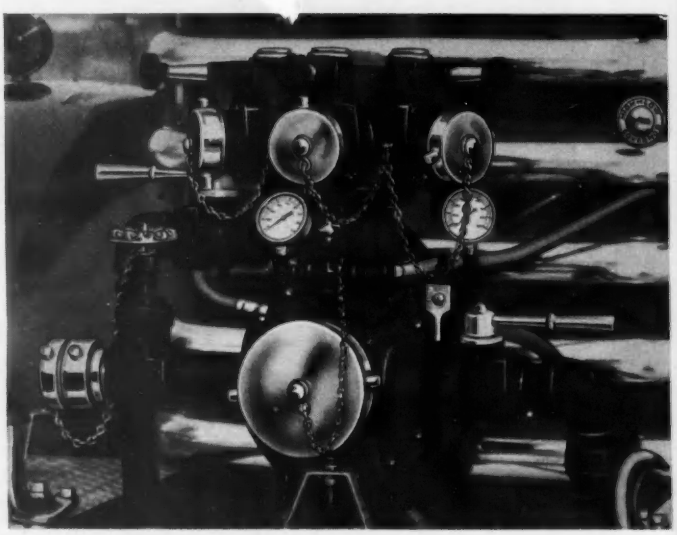

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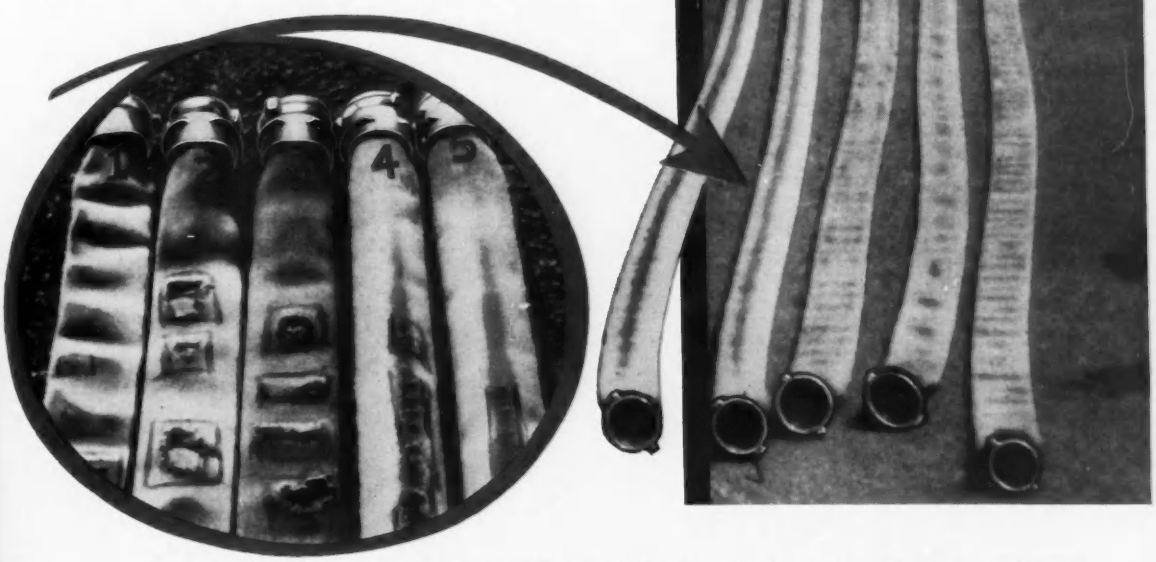

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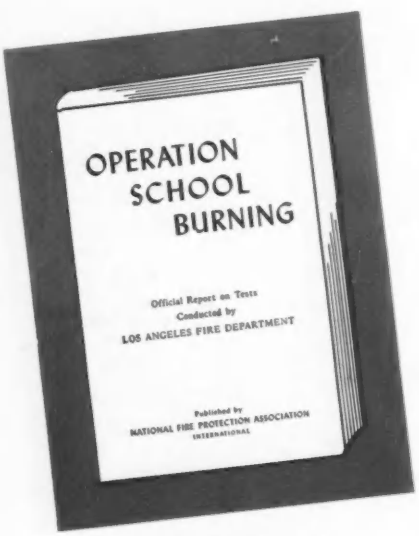

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